The Iron Age

A Review of the Hardware and Metal Trades.

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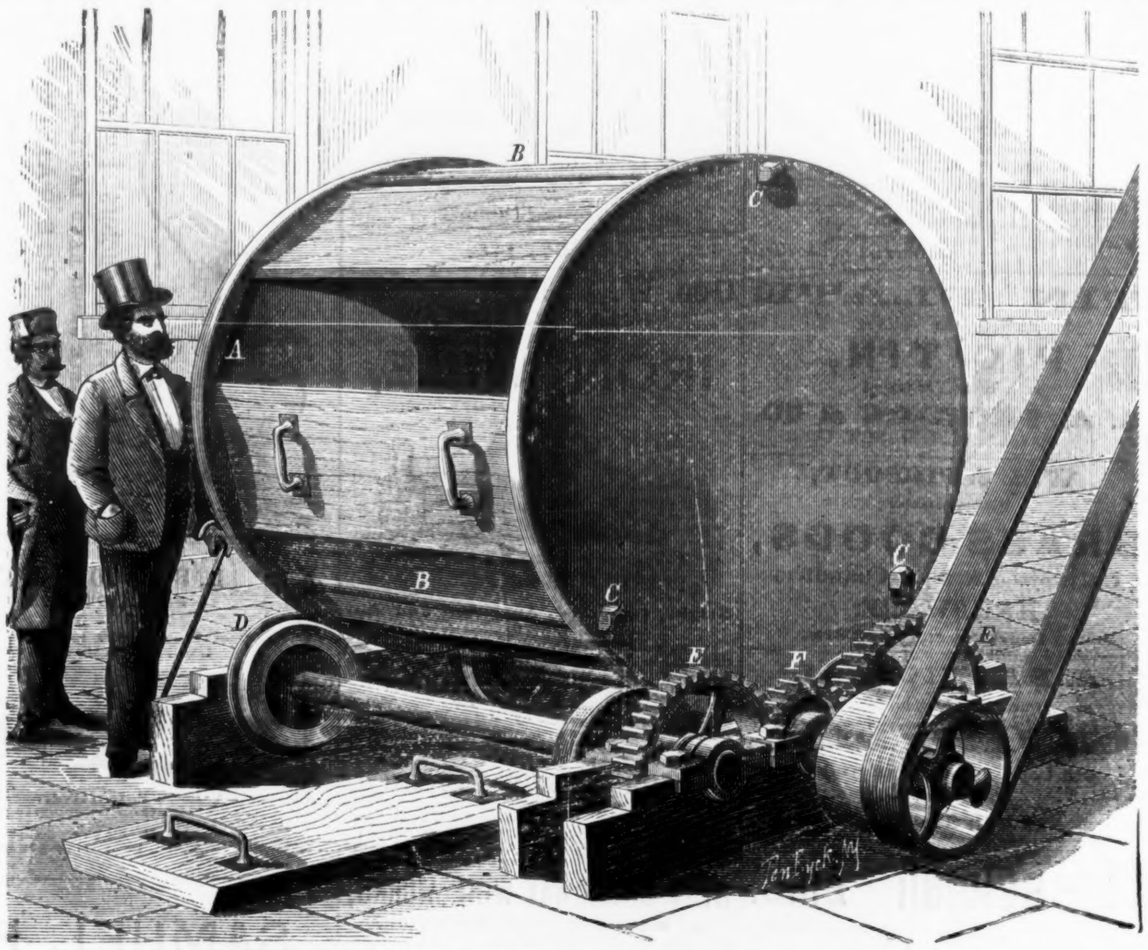
The Miller Grinder for Castings.

The accompanying illustration represents an improved apparatus for cleaning and polishing small castings, such as stove plates, sinks, hollow ware, etc. The cylinder, which is made to revolve by simple mechanism, is made with two heavy wooden or metal heads, and with a lagging of heavy plank or metal forming its sides, in the shape of a number of plane sections. Two or more of these sections are removable in order to admit of the introduction, into the interior of the receptacle of castings, regardless of size and form.

In our engraving one of the sections is shown detached and placed upon the floor. Through the opening thus left will be seen a flange, A, which runs around the circumferences of both cylinder heads. The sections to be removed are provided with suitable handles; and in order to detach them from the grinder, the bolts, B, are slacked up by unscrewing the nuts, C. The ends of the planes are then readily slipped from under the flanges, A, which, it will thus be seen, braces the sections against the outward pressure of the heavy contents of the machine. When the latter is filled, the covers are replaced, the nuts, C, tightened, and the various portions are at once firmly bound together. The sections are provided with suitably beveled edges in order to secure close joints, and those not intended to be removable are permanently secured in place.

The mechanism for rotating the cylinders differs from that employed in the ordinary rumble. In the present case, the edges of the heads rest and revolve upon four flanged rollers, D. Upon the shafts of the latter, which have their bearings in heavy framework, are two gear wheels, E, which mesh with the pinion, F, which is on the same shaft as the driving pulley. It is obvious that the motion of the latter is imparted to the rollers and by these to the cylinder, the weight in the latter, of course, contributing to increase the traction between the surfaces.

The manufacturers have had in use one of these machines, 5 feet in diameter by 5 feet in length, and find that it requires but few repairs, while doing its work with much efficiency. The apparatus has been in operation in their foundry since 1869, and three more have recently been added. From 500 to 1000 pounds of bugs (small scraps of iron from the bottom of the cupola) are put in with the castings, the quantity varying with the size of the machines. The manufacturers also state, in order to show the small amount of power required to drive the apparatus, that they run three grinders, two full of castings and bugs (in dimensions about 2½ by 3 feet) and the other with facing, a 14 inch emery wheel, and a drill with 100 feet of 2 inch shafting with a 1½ inch double belt traveling 600 feet per minute. This device is covered by two patents granted to George Miller, of Providence, R. I., and a third patent to the same inventor relates to the application of the plan to water wheels. It is manufactured by the Miller Iron Company, of that city.

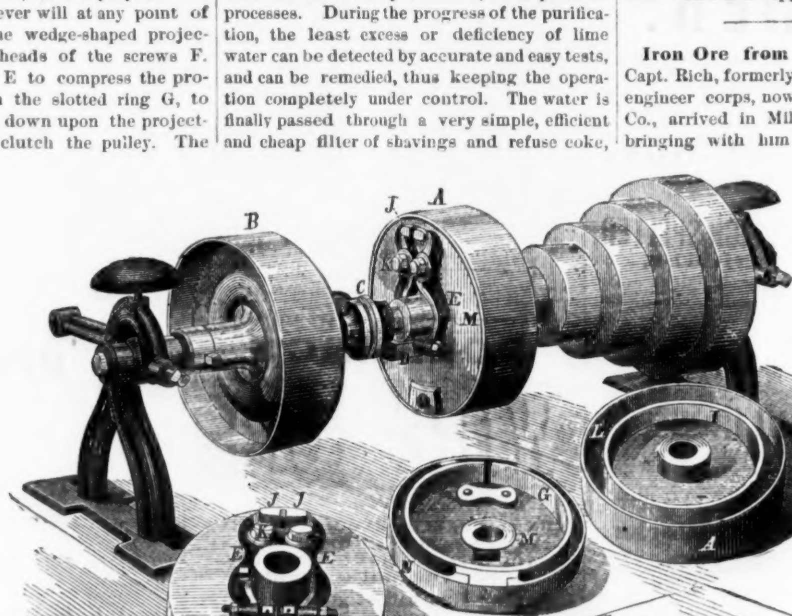


MILLER'S IMPROVED GRINDER FOR CASTINGS.

An Improved Friction Clutch Pulley.

Mr. E. F. Allen, of the Star Tool Company, Providence, R. I., has invented and introduced a valuable improvement in friction clutch pulleys, which we show in the accompanying illustration. There has for a long time existed a feeling of distrust against all kinds of friction pulleys, so much so that some mechanics, as a result of their experience in the use of various kinds, considered them more trouble than they were worth, and gave them up in disgust as unreliable and highly defective. Mr. Allen claims to have wholly overcome these objections. In his improvement the completeness of the friction is obtained by means of the spring grasping the inner rim, securing a hold on a surface equal to that obtained by the belt. It is simply adjusted by altering the screws in the levers E. A very valuable consideration is that it is as easily operated whether the load is heavy or light, while it is no more liable to derangement than the ordinary loose pulley. The shape of the wedge is such that the pulley cannot possibly become released except at the will of the workman. They are much easier to handle than the ordinary clutch pulleys in use for screw cutting, and therefore especially adapted for that purpose, and extensively adapted for cotton looms.

The movement of the collar C clutches and unclutches the pulleys A or B to the shaft. This collar is shown in detail on the foreground, as adapted to clutch a single pulley. At the right is seen the anterior portion; A the belt rim, I a second rim, leaving an annular space in which the clutching takes place. This clutch device consists of a plate or disc M, cast with a rim N. To this plate is attached a ring, cut apart opposite the point of attachment at H; the ends formed by cutting the ring have projections J upon them, passing through a curved slot in the plate M, on the opposite side of which are two bent levers E, pivoted at K. At the ends of these furthest from the pivots are two adjusting screws F, between the heads of which the wedge-shaped projection D on the collar C enters if actuated by the shifting lever, which causes the pivoted levers E to compress the projecting ends J of the ring G together. These attachments to the plate M are by means of this plate keyed to the shaft by means of set screws in such a manner that the ring G surrounds the projecting rim I on the pulley L. On the shaft is also feathered the collar C, so that it always maintains its relative position with the plate or disc M, while a proper movement of the shifting lever will at any point of its revolution force the wedge-shaped projection D between the heads of the screws F. This causes the levers E to compress the projections J together on the slotted ring G, to draw the latter firmly down upon the projecting rim I, and so to clutch the pulley. The unclutching is done by reversing the shifting lever, then the projections J become relieved from pressure; this causes the ring G to expand by its own elasticity, and I is released. We are informed that numerous parties are using this pulley now, and are willing to testify as to its excellence in answering all the desired requirements, and freedom from the drawbacks of other arrangements.



IMPROVED FRICTION CLUTCH PULLEY.

Purification of Hard Water for Steam Boilers, &c.—After a full discussion of the various methods for purifying hard water for feeding boilers and manufacturing purposes, Stingl concludes that the only truthworthy method is that of precipitating the impurities by the proper quantity of a suitable chemical agent or agents, and removing the precipitate in an approved way. The defects in the previous applications of this method have been so far removed by Beranger, in his patented process, that is used with success at a number of establishments. Omitting the detailed working description of the complete but simple apparatus employed, the main feature seems to be the precipitation of the foreign matters by lime water, or lime water and chloride of barium (the requisite quantity of these substances to be accurately ascertained by volumetric analysis of the water), using for the purpose standard lime water instead of soap solution, as in previous processes. During the progress of the purification, the least excess or deficiency of lime water can be detected by accurate and easy tests, and can be remedied, thus keeping the operation completely under control. The water is finally passed through a very simple, efficient and cheap filter of shavings and refuse coke, which not only delivers it clear, but remains effective for several months.

Steel Rails on the Grand Trunk.—The Grand Trunk has now 520 of 1377 miles of line laid with steel, concerning the durability of which Mr. Potter, the president, spoke as follows, at the late annual meeting:

"Let me tell you a very curious little incident respecting the life of a steel rail. We have got on our line, near Kingston, half a mile of steel rails, on the most crowded part of our line—laid down in 1865—therefore, over which eight summers and seven winters have passed. Now, not one single rail of that sixty or seventy tons has been changed, nor is there any appreciable sign of damage or wear and tear, except that the whole surface is smooth. We had those rails carefully examined and measured by a very delicate instrument. There is no sign of any wear of any kind whatever—none of them have broken—none of them are in any way touched, except that they have a perfectly smooth and even surface; and this instrument shows that, if the wear and tear of the rail continues as it has done for the last seven or eight years, those rails will last for 180 years. I tell you what the instrument shows—of course you must not suppose that I mean to tell you that they will last that time; but that is the simple fact—there is no appreciable wear and tear."

Iron Ore from the Penoka Range.—Capt. Rich, formerly of the Wisconsin Central engineer corps, now with the La Pointe Iron Co., arrived in Milwaukee a few days ago, bringing with him several fine specimens of magnetic iron ore fresh from the mines now being developed by the La Pointe Iron Co. Within one-half mile of the Wisconsin Central Railroad, on section 15 of T. 44, R. 3 west, is the locality where the La Pointe Iron Company have sunk a 10x16 foot shaft, and already, having dug 18 feet through the loose sand and gravel drift, have struck a vein of very rich ore from twenty to thirty feet in width. Specimens of the ore from the mines of the La Pointe Company are so strongly magnetic as to represent perfectly both the magnetic poles, and will attract or repel the compass needle held at a distance of six or eight inches. There is no longer doubt that the Penoka Iron Range is rich in valuable magnetic ore, and it is safe to predict that Northern Wisconsin will soon become a rival of the peninsula of Michigan in its production of iron ore.—*Milwaukee Journal.*

A New Treasury Decision.

The following recent decision by Secretary Richardson, will be found of great importance to all those engaged in the iron trade:

TREASURY DEPARTMENT,
WASHINGTON, March 2, 1874.

SIR:—Messrs. Naylor & Co. have appealed (sections 1911, 1912 and 1913 B) from your decision assessing duties at the rate of thirty-five per cent. *ad valorem*, less ten per cent., on certain bar iron imported by them from Sweden, per barks Regia and Nannie T. Bell, and from London per bark Cotopaxi. The act of June 30, 1864, imposes certain specific duties on bar iron in round, square and flat, but provides that it shall not pay a less rate of duty than thirty-five per cent. *ad valorem*. The same act also imposes a duty of 1½ cents per pound on all other descriptions of rolled or hammered iron not otherwise provided for. The iron forming the subject of these appeals is not literally in the shape of either round, square or flat, but is an irregular octagon. The reasons assigned in the report of Appraiser Rice, dated the 24th of January last, for classifying it as above, instead of as rolled or hammered iron not otherwise provided, are that the department decided April 4, 1871, on the appeal of the Washburn and Moen Manufacturing Company, which embraced substantially the same kind of iron, that although the iron was slightly flattened on the corners it was not so changed as to take it out of the category of square iron.

I find, however, upon further investigation, that the department under date of February 11, 1862, made a decision as to the classification which should be given to certain iron invoiced as octagonal card-wire iron and described as having the edges of the original square bar hammered or bevelled to prevent waste, wherein it was held that as the iron was not actually flat, round or square, it should be considered as embraced in the provision for all other descriptions of iron not otherwise provided for. Upon a careful consideration of the subject I cannot but regard the decision of April 4, 1871, as an innovation upon the true construction of the law, and that the only proper rule of action in the matter is to follow the decision of February 11, 1862. It appears from the papers submitted that the trade do not recognize as square, round or flat, any iron not actually in those shapes, and as the law regulates the duty by the shape of the iron, the department feel constrained to adhere to the decision of February 11, 1862, and to reverse that of April 4, 1871.

You will therefore govern your actions accordingly and readjust the entries embraced in these appeals at 1½ cents per pound, less ten per cent., classifying it as rolled or hammered iron not otherwise provided for. I am, very respectfully,

W. A. RICHARDSON, Secretary.

To the Collector of Customs, Boston, Mass.

Decrease in Exports from Great Britain to the United States.

The Chief of the Bureau of Statistics sends us the following statement, showing the decrease in the exports of the following articles from Great Britain to the United States, in the month of January, 1874, as compared with those of January, 1873; also some figures showing the condition of the British import trade with the United States:

Articles.		Mnt'h ended January 31. 1873.	1874.
Clothing	Val. £	30,131	15,651
Copper, in ingots	Cwts.	12,065	90
Copper, manufactured	"	310	41
Earthern and china ware, parian and porcelain	Val. £	63,038	31,861
Hardware and cutlery	"	76,712	57,661
Iron, pig			
Iron, bar, angle, bolt and	Tons.	9,031	6,275
rod	"	3,549	376
Iron, railroad of all sorts	"	27,838	7,444
Iron, hoops, sheets and boiler and armor plates	"	2,633	722
Lead, pig, rolled, sheet, piping and tubing	"	789	201
Linen, piece goods	Yds.	11,387,700	11,121,160
Machinery	Val. £	59,166	23,916
Paper, writing and printing	Cwts.	4,926	1,751
Salt, rock and white	Tons	21,516	15,979
Silk ribbons of all kinds	Val. £	16,489	5,590
Articles of silk mixed with other materials	"	13,667	7,191
Spirits, British and Irish	Galls.	9,015	4,436
Wool, sheep and lambs	Lbs.	8,040	7,259
Woolen cloths	Yds.	1,019,056	928,730
Worsted stuffs	"	11,349,686	8,377,900
Carpets	"	699,636	510,210
		1872.	1873.
Total exports to the U. S. in the quarter ended Dec. 31	£	8,092,291	5,809,417
Total exports to the U. S. in the year ended December 31	£	40,736,597	33,561,107
British Imports.			
Total imports from the U. S. in the quarter ended Dec. 31	£	12,705,911	16,054,490
Total imports from the U. S. in the year ended Dec. 31	£	54,663,948	71,486,045

—*Bulletin Iron and Steel Association.*

Pyrolith.—A fuel burning without smoke, needing no attention after lighting, and said to be especially adapted to heating railway cars, has been patented in England. It consists of a mixture of pulverized charcoal or coal with some material affording oxygen when heated, as nitrate or chlorate of potash, &c. Some cementing substance such as gum, starch or water glass is employed to form it into cakes which are compressed and dried at a gentle heat. Special apparatus has been devised to its combustion.

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Hayden's Patent	Copper Tubing,
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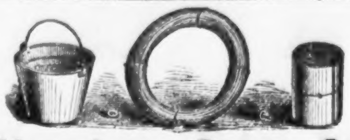

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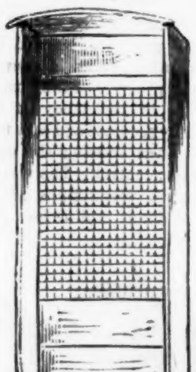

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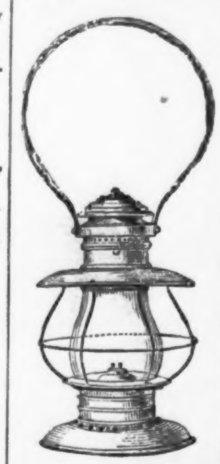

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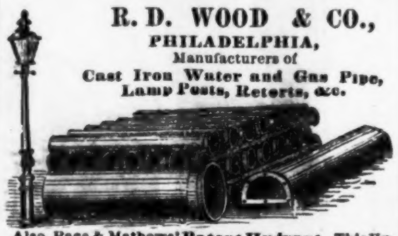

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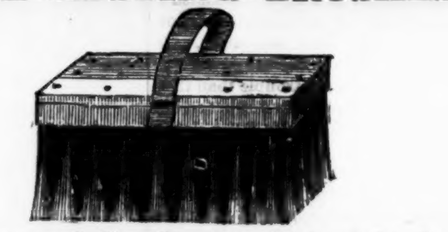

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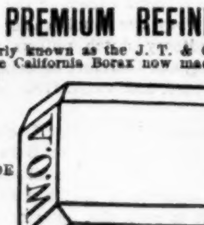
TRADE  MARK.

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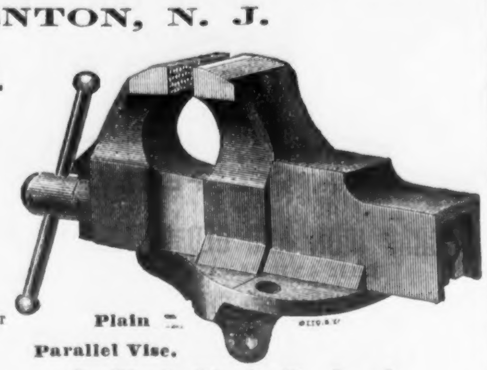

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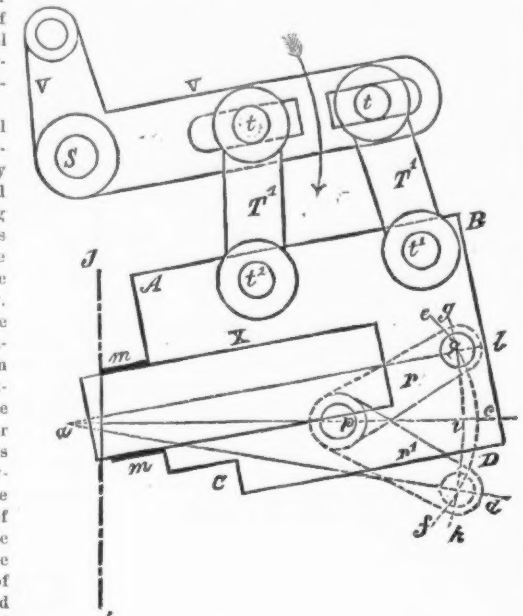
Badger Place, Charlestown, Mass.

Lawrence's Self-Feeding Nail Machine.

At the works of Messrs. Hadley, Birmingham, a number of Lawrence's self-feeding nail machines have been put in operation with very satisfactory results. The improvement is thus described:

The main gearing of the machine rocks the bell crank lever V upon its fulcrum S, and the longer arm of this lever moves the table by the links T^1, so causing the center line of the strip X to alternately coincide with the dotted lines *a b* and *a d*. Therefore the feed table moves round an imaginary center at *a*, and the nail blanks are thus cut taper, while the wider end of each alternate blank is cut from alternate edges of the plate or strip. The strip is fed forward toward the knives between each cut by means of feed rollers having a step by step movement. It will be perceived that the ends *t* of the links T^1 are adjustable along the lever arm V. This simple contrivance serves to regulate the amount of taper to be given to the blank, and also, as the imaginary center *a* is beyond the line *j k*, causes the extreme end of the strip to have a slight movement of lateral translation at each alternation of the feed box.

This movement of lateral translation is very important, as it regulates the amount of metal for the head of the nail; and, inasmuch as the blanks are cut with their wider ends alternately from each side of the strip, this allowance of metal for heading must be made alternately at each side of the gripping dies.



LAWRENCE'S SELF-FEEDING NAIL MACHINE.

Ingenious as are the mechanical arrangements which we have described, and efficiently as they perform the lateral and forward movements necessary for feeding the machine, there yet remains a most important provision to be made, without which the machine would not work satisfactorily. It is absolutely necessary to the proper working of a cut nail machine, that at the moment when the cutting knife rises after making the cut, the strip should be slightly drawn back, so as to clear the edge of the rising knife. This is very neatly done in Mr. Lawrence's machine by means of the link *r*. In the main framing of the machine under the feed table is the stud *p*, upon which the link *r* works. The other end of the link *r* engages with the stud *q* on the under side of the feed table. As the rocking action of the lever V turns the feed table about the imaginary center *a*, the point *q*, in the line *ab*, would necessarily move to *i*: because the arc *gh* (struck from the center *a*) cuts the center line *ac* at *i*. But the action of the link *r* causes the point *g* to describe the arc *cf*, and thus the table is drawn back by the link *r* to the extent of the difference of the curvature of the two arcs *cf* and *gh*; and as the knife rises the end of the strip is kept clear. Equally the action of the link *r* slides the strip forward for the cut by the time that its center line coincides with *ad*. It will thus be seen that by means of exceedingly simple and durable contrivances, the complex motions proper to the feed table are efficiently produced and controlled.

There are many other meritorious provisions in this machine for regulating the taper of the blanks, and the sizes of the heads of the nails required to be made, which we could not describe without the aid of a complete set of drawings; but it is proper to mention that the strips are piled up in a box on the feed table, a considerable number at a time. The machine, as fast as one strip is cut up into blanks, constantly supplies itself from this pile by taking the lowest strip of the pile in between the feed rollers, and thus the work of cutting goes on uninterruptedly. Not only so, but, as the attendant can put a number of strips at a time into the feed box of each machine, as many as five and twenty machines can be kept supplied by one attendant. Furthermore, while considerable practice is necessary to the successful performance of hand feeding, none whatever is needed to enable any person to pile the strips in the feed box of the improved machine.

The Uses of Blast Furnace Slags.

BY P. TUNNER.*

The slags from iron furnaces have long been employed as building material for special purposes. To prepare them for this use it was customary to allow the fluid slag, as it flowed from the furnace, to run into iron or sand molds to give it the desired shape. In Sweden, the Tyrol, Bavaria, and other places in Europe, blocks of slag have been used for low structures both on land and water, and even in furnaces, as well as for cornices and moldings, for several decades. Of course the basic, stone-like slags are the best for this use, and their strength is increased if they are devitrified by cooling them slowly, or by purposely annealing them. To obtain a lighter and more porous building material for arches which have only their own weight to support, and hence do not require great strength, it is customary in Bavaria to run the slag in a drain pond, or reservoir, from which it is flowed suddenly into a second reservoir partially filled with water, whereby it is converted into a state resembling pumice. When cold this mass is broken up into pieces of the desired size. Drops of iron contained in the slag settle in the first reservoir.

A building material prepared in this manner causes, both before and while being laid, much litter and refuse, and is always an untrustworthy material, so that it can only be used for walls that are not very high. It must be excluded entirely from lofty walls, and because of its low price it cannot bear the freight charges for shipping it long distances. In short, its uses in this way are very limited.

Another use that would naturally occur, and which has often been tried, is for the macadamizing the streets, and making walks in parks and gardens, and also as sand for ordinary lime mortar. Its brittleness and want of strength render it ill suited for roadways, or on much traveled streets, as it is very soon ground to mud. For this purpose, too, it was proposed to devitrify the slag by slow cooling. Yet, in spite of all this, slag could only come into use in those cases where a better material could be obtained only at a high price. For park and garden walks, as also for mortar, the slag must first be reduced to pieces of a suitable size, and screened. The cost of this is slight, and it is sometimes undertaken for the sake of the iron contained in it. It is unfortunate that the demand for garden paths is very slight, and, beside, the walks covered with it are both unpleasant to walk on and injurious to fine shoes.

Slag can often be used to advantage for mortar sand, and its use for this purpose in buildings at, or in the neighborhood of, blast furnaces has considerably increased in the last few years. As ordinary sand can be obtained cheaply, sand from slag cannot bear the expense of transportation for long distances, and so its use must be a limited one. Another use for slag sand is for ballast on railroads, the ties being imbedded in it. As in the former case, it cannot bear the expense of transportation without too great an increase of price.

All these uses for slag are entirely insufficient to consume the enormous quantity produced every year. The proprietors of blast furnaces would not seek for other uses for their slag, if it were not for the difficulty of disposing of it, as it must either be transported to a distance at much expense, or allowed to occupy much valuable ground which could be used for other purposes. Especially in modern times, when the manufacture of iron is increasing, and with it the quantity of slag grows larger, and the ground becomes more valuable, much trouble is taken to find corresponding uses for slag. This is evident from the discussions of various societies like the Iron and Steel Institute in England, the articles in different trade journals, as well as in reports of the Vienna Exhibition.

Among the Alps, where iron furnaces are usually situated on the steep sides of the valleys, the heavy fall of water is made use of to transport cheaply to other parts of the world the slag when reduced to suitable sized pieces. As the quantity of slag increases, this cheap way of getting rid of it becomes objectionable, as that which settles injures the brook and river courses, and is a disadvantage to those who own the adjoining lands. Hence another method of removing or using slag possesses a growing interest even for those in the Alpine countries.

The most recent methods proposed for using slag as building material look to its granulation to a moderately find sand, which is then mixed with a certain quantity of lime and at once pressed by powerful machinery into molds so as to form bricks of any desired shape, and these are finally dried in the air. Bricks made in this way possess many advantages as building material over those formerly made directly from the melted slag. A manufactory of these slag bricks at Osnabruck seems to have brought this method to a considerable perfection. In group I, No. 145 of the German section of the Vienna Exhibition, such bricks were exhibited and the following data given:

"The Osnabruck Stone and Trass Works, founded by act of incorporation dated May 29th, 1865, undertook to use the slag of different blast furnaces in every possible shape. At first only ordinary bricks were made from the slag of the Georgs-Marien Furnace, near Osnabruck. One of Bernhard's hand brick presses was used. The granulated slag was mixed by hand with slaked lime, pressed in the machine, dried and hardened in the air, at first on a level place, afterward in piles or heaps. The granular slag contains soluble silicic acid, and when pressed or stamped will harden without lime, but more slowly than with it. The hardening of the stone is due to the formation of carbonate of lime, as in ordinary mortar, and by the formation of solid compounds between the soluble silicates in the slag and the lime mixed with it. The granular slag, when ground hardens alone as well as when mixed with lime, but in the latter case it hardens better and more rapidly.

"The bricks made with a hand press satisfied but a few of the requirements, and attempts were made to cast bricks made of ground slag and lime in molds. The large space required, and the difficulty of preparing so many casting places, prevented this method exceeding a large-sized experiment. Until 1870, the bricks were made exclusively with hand presses, of which five were in use. These presses required very frequent repairs, as they offered but little resistance to the sharp, hard slag, and hence attention was directed to a steam brick press. The mixture of slag and lime could not be worked in presses used for clay brick, for it had not sufficient consistency to permit of cutting apart, so each brick had to be pressed by itself separately.

"At the Paris Exposition, in 1867, Francois Durand, in Paris, exhibited a brick press which seemed to satisfy the requirements. Such a press was purchased in 1870, and, although correct in principle, was useless in its present form. The cost of repairing this press exceeded in one year its total cost. To avoid the essential faults, a second machine was made in 1871 by Bruck, Kretschel & Co., Osnabruck. This press underwent twelve essential modifications between 1871 and 1873, and without these it could not have been used in making bricks of slag.

"The first machine constructed by Bruck, Kretschel & Co. was so seriously injured by use that it had to be sold as old iron. Not until a third and much improved press was obtained in 1872, seven years after the experiments began, did the manufacture of stone from slag pass from the experimental stage to the practical. In 1872, the three improved presses, obtained after much trouble, time and money had been spent, and with the aid of several ingenious artisans, manufactured 2,246,000 slag bricks.

"The slag works at Osnabruck now have five steam brick presses in operation. Four of these were made by Bruck, Kretschel & Co., and make 30,000 bricks per working day, consuming 100 tons of granulated slag, which was previously a worthless material.

"The difficulties arising from differences in the amount of moisture in the slag, reaching 40 per cent. sometimes, and the experiments on the use of slaked or disintegrated lime, in powder or in paste, can only be referred to.

"Experiments for mixing and measuring the slag and lime by machinery, instead of hand, utterly failed, although an ingeniously contrived attachment for the purpose was constructed at great expense in 1871. After testing a mixing machine, they have gone back to a simple mortar mixer, into which the materials are placed after measuring by hand. Beside these difficulties in the manufacturing operations, the sale of these slag bricks met with a prejudice in many builders, which often seemed insurmountable. It was only through the confidence which the managers of the Georgs-Marien furnace placed in the material, and the continued use of it in large quantities, that this industry, at first so unimportant, was able to rise to its present hight.

"The following figures show the development of this branch of manufacture in spite of opposing difficulties: The Osnabruck Stone and Brick Factory made, in 1866, 345,2[illegible]0 bricks of the ordinary size; in 1867, 439,670; in 1868, 597,525; in 1869, 700,425; in 1870, 1,274,850; in 1871, 1,787,830; in 1872, 2,246,950; and in 1873 about 6,000,000.

"Last year several good dwelling houses and a large factory were erected of these bricks, beside numerous smaller buildings. At the Georgs-Marien furnace these bricks, or artificial stone, were used for lofty buildings, and have supplanted all other building stone. A large number of double houses for workmen were erected there, and also a miners' hospital for thirty-two patients, a boarding and lodging house for 200 workmen, a public house and several residences for officers. The Evangelical congregation intend building a church of this stone, and Oberbaurath Hasse, in Hanover, who drew the plans, decided that this material was suitable for the purpose.

"The manufacture of trass mortar and of large building stone by the use of hydraulic presses will be the next undertaking of the Osnabruck Stone and Trass Works. In a few years they intend to use all the slag of that furnace. A di-integrator for making trass has been purchased, but the experiments with it have not yet been concluded. The use of blast furnace slag for making artificial stone, since success has attended the use of steam presses, has attracted much attention from German furnace managers and owners, as shown by the frequent visits to the works.

"The Osnabruck Stone and Trass Manufactory is now prepared to assist in erecting similar works in Germany and Austria, when guaranteed that the presses and process will not be imitated, or their inventions pirated.

"The process is patented in England and America, and patents on the improved presses have been applied for.

[Signed] W. H. MEYER & Co."

The manufacture of so-called slag wool, and its use for protecting the pipes that convey the hot blast, are very interesting. Every one has seen this fibrous slag produced accidentally, when the molds were very wet. The intentional preparation is as follows: A small stream of slag falls into a closed chamber and is struck at right angles by a jet of steam, broken up into fibres, and easily separated from the coarse lumps of slag which escape this transformation. No special importance can, of course, be attached to this original use for slag.

Experiments have also been made in England to use slag for artificial stone and brick. (See Proceedings of Iron and Steel Inst., 1873, Vol. I, pp. 189–196). From this it appears that slag sand can be made for 3d. per ton, and that lime costs 15/; hence the cost of making 100 slag bricks of ordinary size would be as follows:

	s.	d.
2½ tons slag sand at 3d......................	0	7½
Lime....................................	4	0
Use of machine...........................	1	3
Coal and water..........................	1	0
Labor....................................	3	2
Round total..........................	10	0

or $2·50 in gold.

The remarkably cheap preparation of the sand from slag is due to running the slag directly from the furnace, in a fine stream, into a rapid stream of water, or into a basin of water provided with a large and strong stirring wheel. The principal cost is for labor and lime. The quantity of lime required is one-sixth to one-fourth of the weight of the sand, and must depend on the chemical composition of the slag, as more lime is required with a very silicious slag than with a basic one. On this account the basic slags, as obtained from Bessemer iron, are preferable for making slag brick.

Bricks pressed in hydraulic or steam presses are so dense that, after drying for two or three weeks in the air, they are ready for use or shipment.

Although all furnaces are not so favorably situated as to be able to use their slag extensively for making brick, yet this might be expected of those near large villages or factories, where ordinary burnt brick sells for $12 to $15 per thousand.

*Translated for the *Journal of Applied Chemistry* by Mr. Edward J. Halleck, A. M.

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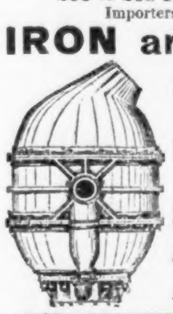
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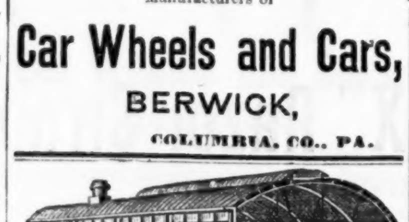
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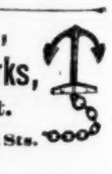
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CONTENTS.

Letter to Isaac Lowthian Bell, Esq. Translator's Preface.

SECTION I. Recent Modifications in the Regime in Blast Furnaces. II. Successive Enlargements of Blast Furnaces. III. Principal Reactions in Blast Furnaces. IV. Quantities of Calorie absorbed and given off in Blast Furnaces. V. The Economical Working of the Furnaces varies with the ratio of $\frac{CO^2}{CO}$ in the Gases. VI. The ratio $\frac{CO^2}{CO}$ is the Measure or Index of the Economical Working of Blast Furnaces. VII. Weight and Composition of the Escaping Gases—Construction of Analytical Formulas of Calculation. VIII. Agreement of the Formulae with the Complete Analysis. IX. A method of taking Specimens, securing a Mean of all the Gases during several hours. X. Determination of the Caloric *consumed* in Blast Furnaces. XI. Caloric *absorbed* by the reduction of the Ores and the fusion of the Pig Iron. XII. Caloric absorbed by the fusion of the Slag, the decomposition of the Limestone, etc. XIII. Sensible Heat carried off by the Gases. XIV. Caloric lost by Radiation from the walls of Furnace, etc. XV. Determination of the Caloric *received* by a Blast Furnace, solely derived from transformation of Carbon into a Mixture of CO^2 and CO. XVI. *First Example*—Clarence Furnace, 1853—gives 0·40 of the Calorific Power of Coke consumed. XVII. *Second Example*—Clarence, 1866—gives 0·48 of the Calorific Power of Coke consumed. XVIII *Third Example*—Ormesby Furnace, 1867—gives 0·44 of the Calorific Power of Coke consumed. XIX. *Fourth Example*—Consett Furnace—gives 0·45 of Calorific Power of Coke. XX. *Fifth Example*—Consett Furnace—gives 0·47 of the Calorific Power of Coke. XXI. Consequences derived from the preceding Examples—Synoptical Table of Results. XXII. Influence of Extra Slow Working. XXIII. Influence of great Hight and Capacity. XXIV. Beyond a certain hight the Temperature of the Escaping Gases does not diminish by reason of the dissociation of the Oxide of Carbon. XXV. Influence of Highly-heated Blast. XXVI. Conclusions. XXVII. Application of the New Method of Analysis to a French Blast Furnace—gives 0·48 of Calorific effect of Coke consumed. XXVIII. Another Example of French Blast Furnaces.

APPENDIX. NOTE I. On taking Specimens of the Escaping Gases. II. To explain what is meant by "Strengflussige Erzen," "Minerais refractaire." Plattner's Experiments on the Temperature of *Formation* of Slags. III. On Ebelmen's assertion that it takes twice as much Coke as Charcoal to smelt the same quantity and quality of Pig Iron. IV. Charcoal decomposes CO^2 more rapidly than hard or soft Coke does. V. A Brief History of the Theory of the Blast Furnace, and of most recent practical results; Lampadius—1837-38; Karsten—1839; Bunsen first analyzed Blast Furnace Gases, and drew consequences therefrom—1838; Ebelman followed in the same course—1840-42; State of Calorimetric determinations of the Caloric of combustion in 1839; Before Analysis of Gases were made, viz., 1811, they were variously applied in France; Patent of Mr. Palmer Budd—1860; Percy's "Metallurgy of Iron and Steel," published 1863-4; Schinz's Work, published 1868, was the first which took the Calorific Phenomena of the Blast Furnace into consideration; Schinz's Experiments on Reduction; Lowthian Bell's Studies of Blast Furnace Phenomena began to be published in 1869; Experiments on Reduction by Furnace Gases directly applied; On the presence of Alkaline Cyanides; On Dissocation of CO; On the Behavior of Limestone; on Influence of Superheated Blast. VI. Useful Tables and Memoranda for Calculations of Blast Furnace Phenomena.

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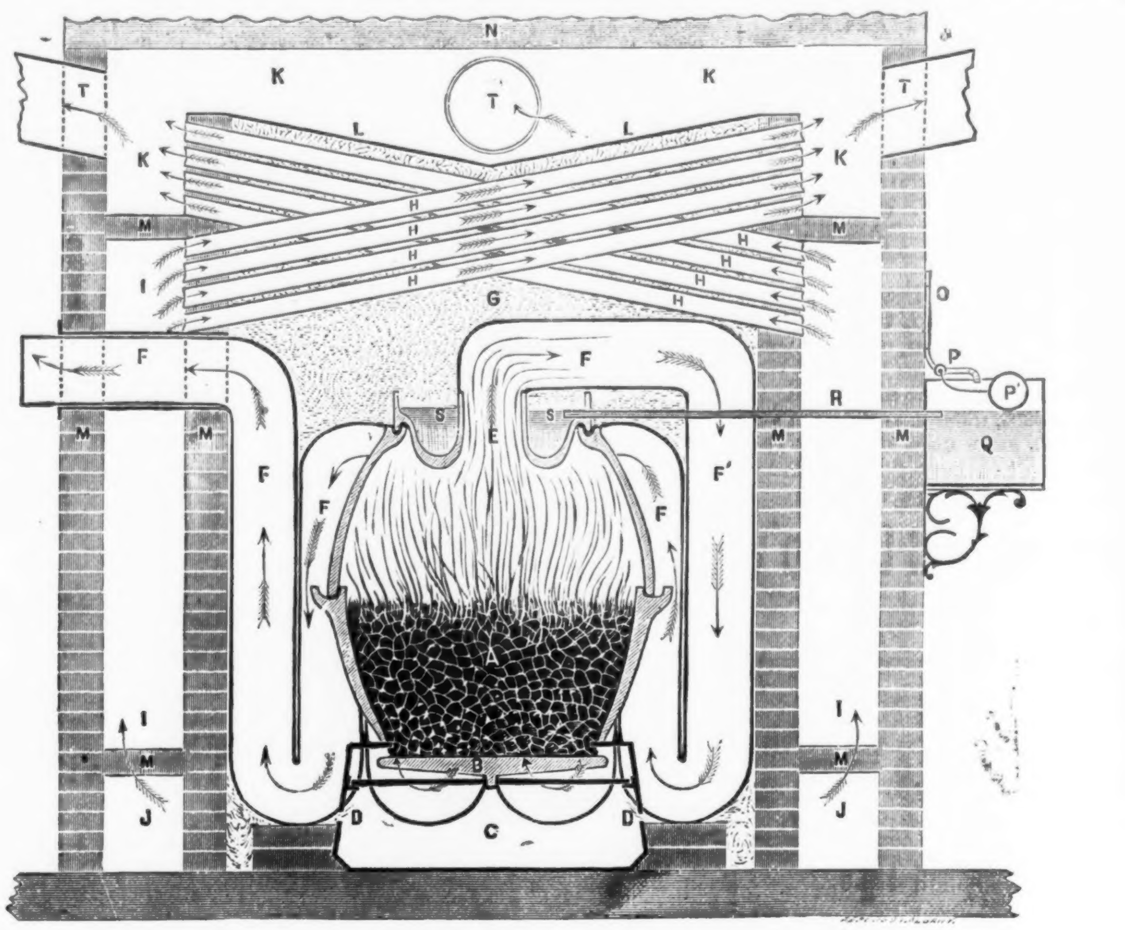
We illustrate herewith an improved superheated steam air-heating furnace, made under Bulkley's patent by Messrs. Perry & Co., of Albany, N. Y. This furnace is new in principle and operation, and combines many features of novelty and merit. The following will enable the reader to fully understand its construction by the aid of the letters of reference in the illustration:

A Fire pot and combustion chamber.
B Clinkerless grate.
C Ash pit.
D Openings for steam to escape from chamber G to ash pit.
E Smoke exit from fire pot.
F Smoke and gas flue radiators.
G Chamber in which steam is generated from S, without pressure.
H Pipes or flues, through which the air passes to be heated for use.
I J Flues formed in brick walls for the distribution of cold air to pipes, H.
K Hot air chamber, from which pipes T are supplied.



AN IMPROVED STEAM HEATING FURNACE.

L Roof over steam chamber, G.
M Brick walls enclosing furnace, and forming cold air flues.
N Roof over all, covered with plaster, ashes, or any non conducting substance.
O Pipe to supply water to tank, Q.
P P Faucet and regulating float.
Q Water tank.
R Pipe to supply water to steam generator, S.

In this furnace the steam is generated in an open pan, without pressure, and there can be no danger, therefore, from explosion. When the steam has filled the chamber, in order to give place to that subsequently generated, it escapes through two half inch holes into the ash pit, from whence it passes through the mass of burning fuel, aiding in the combustion of the volatile gases, and producing thereby a greatly increased volume of flame. The air which passes through the registers is as pure and wholesome as that which enters the windows in the month of June; it has no connection with that in the furnace chamber, and therefore cannot be contaminated by coal gas, smoke, or any of the unpleasant odors which are inseparably connected with air that has been brought in contact with highly heated plates.

This furnace costs but little more than the best patterns of ordinary hot air furnaces, and is no more expensive to keep in repair. It is adapted to any kind of building which requires to be heated, and is made in three sizes, so as to adapt it to the various requirements of the trade. For conservatories and green houses it is especially adapted, as the pure, warm air which it supplies does not injure the most delicate plants. It has received the highest testimonials from experts and sanitarians, and merits the favorable notice of the trade.

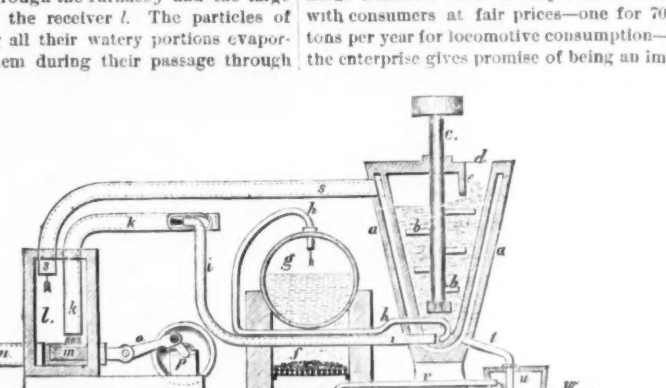
A Peat Fuel Manufactory for New Haven.

A number of New York and New Haven capitalists have formed a company for the manufacture of peat fuel on a large scale at New Haven, Connecticut, by a process with which we have long been acquainted, and which we believe to be entirely practicable for the manufacture of marketable peat fuel at a price which will leave a liberal margin for profit. We have carefully examined the machinery to be used in this establishment, and samples which we have seen of the fuel made by it, enables us to speak confidently of its practicability. Mr. T. G. Walker, of this city, is the inventor, and after satisfactory and successful experiment with it, the New Haven company have bought the right for the whole United States.

The principal, and, indeed, the only serious obstacle to the successful manufacture of peat fuel in this and other countries has been the cost of preparing it—too much hand labor being necessary in the various processes of cutting, drying and pressing. Peat has hitherto been worked upon two general systems, varying in detail, but the same in principle. One of these systems molds the peat into bricks, blocks, or balls, while in the wet state, and drying the moisture from them, either by exposure to dry weather or to warm air in a kiln. The other dries the peat soil first, either in the summer sun or in a kiln, and presses the dry fibre and dust afterward by mechanical appliances of various kinds. Both systems are worked in Europe with cheap labor, but they cannot be successfully employed in this country while coal is cheap and wages are high.

When the peat is dried of its moisture by exposure to the atmosphere, either before or after molding, by either of these two systems, too much handling is necessary; also, it is too dependent upon the weather. The season for drying is very short, while some of the expenses must continue the whole year. The working expenses must be paid out for the whole year's crop during the summer, and the returns received in the ensuing winter—in other words, the capital turned over only once a year. Where the peat is dried in kilns, the fuel to dry it is expensive, as the whole of the heat is allowed to escape in vapor. Peat molded into forms can only be dried at a low temperature; otherwise, by too rapid evaporation, the mass will disintegrate. Thus the quantity which can be dried in a kiln of convenient size is, at most, limited.

In the process invented by Mr. Walker these difficulties have been overcome. The principle on which the machine is constructed may be seen from an examination of the accompanying illustration. Wet peat from the swamp is thrown into the pug mill vat *a*, where it is heated by steam thrown off from the previously heated material, and conducted by the pipe *s* to the steam jacket of the pug mill vat where it is condensed. From the bottom of the vat superheated steam, taken from the boiler *g* through the pipe *h*, and issuing in a jet at the mouth of the large pipe *i*, blows the peat by the pipe *i* through the furnace *f* and the large pipe *k* into the receiver *l*. The particles of peat, having all their watery portions evaporated from them during their passage through



PEAT DRYING MACHINE.

the pipes, fall to the bottom of the receiver *l*, and are pressed into forms through the pipe *n* by the plunger *m*, while the steam and gases, rising to the top of the receiver *l*, pass by the pipe *s* to and around the pug mill vat, and heat the fresh material as before referred to; and thus, by imparting its heat, the steam is condensed to water, which passes off by the pipe *t* into the tank *u* and the syphon *w*. These three heatings, viz.: in the vat from the waste steam, by contact with the superheated jet of steam, and by heat derived from the pipes in the furnace, evaporate the watery portions completely, and separate them from the material. The same process conducted at a higher temperature throws off the volatile properties, and carbonizes the peat, giving, as a result, a hard-pressed peat—charcoal. In this case, the combustible gases rising to the surface of the tank *u*, before alluded to, are led by the pipe *v* into the furnace to aid in heating. The fuel, perfectly dry, or carbonized at option, is ready for consumption at the mouth of the mill. It is very compact, weighing over 75 pounds to the square foot. The passage of the particles of peat through the pipes is almost instantaneous. The mill can be run day and night, in winter as well as summer, and without reference to the weather.

Peat, like most other plastic substances, when air-slacked loses all cohesive properties; for this reason dry peat fibre cannot be pressed into form except at an expense of great mechanical force, and then the action of dampness tends to disintegrate it; hence, the failure in the durability of dry-pressed brick, as has been often demonstrated. By this process the peat does not become air-slacked; it is never in contact with air while in the mill, but retains its chemical cohesion, to which is superadded mechanical pressure.

The cost of manufacturing peat fuel by this process is much less than by any other of which we have any knowledge. One ton of dry peat will furnish steam enough to heat 40 tons of wet peat. The expense of digging the wet peat from a well drained bog and putting it in the pug mill vat is known to be covered by a cost not exceeding one dollar per ton of dried fuel. A mill passing 200 tons of wet peat every 24 hours, and producing a net average product of 50 tons, would cost to run:

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Result, 50 tons dried, less five tons consumed in the furnaces; leaving net result for 24 hours work, 45 tons, costing $75, and worth $5 per ton. The New Haven Company have leased an extensive peat bog near that city, with privilege of purchasing it, and will have a plant representing an investment of nearly $100,000. Large contracts have already been concluded with consumers at fair prices—one for 70,000 tons per year for locomotive consumption—and the enterprise gives promise of being an important addition to the manufacturing interest of New Haven.

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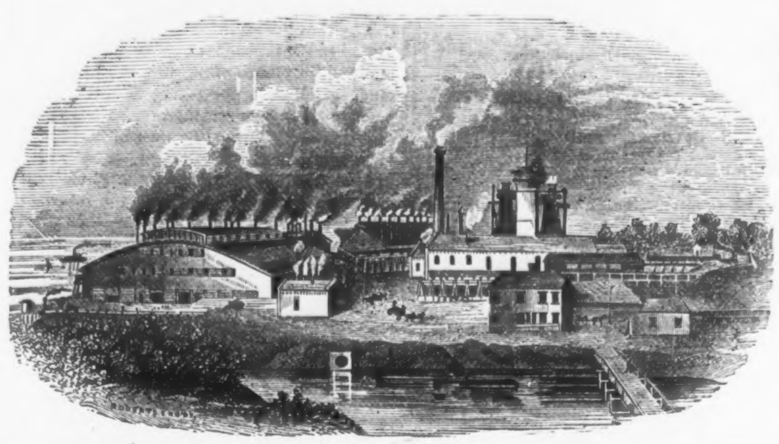
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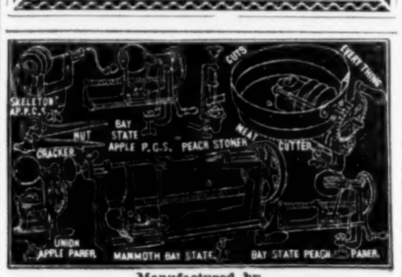

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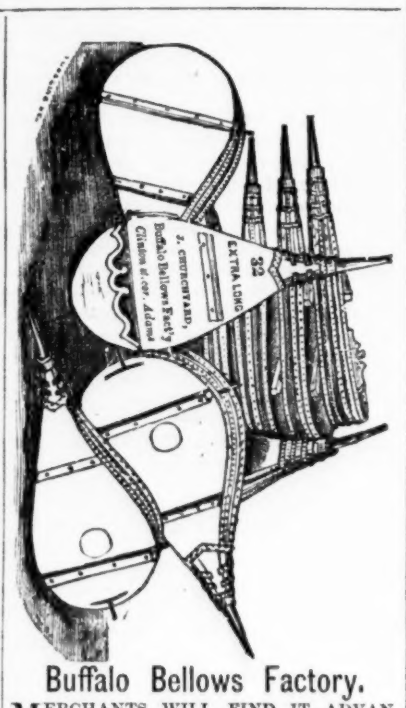

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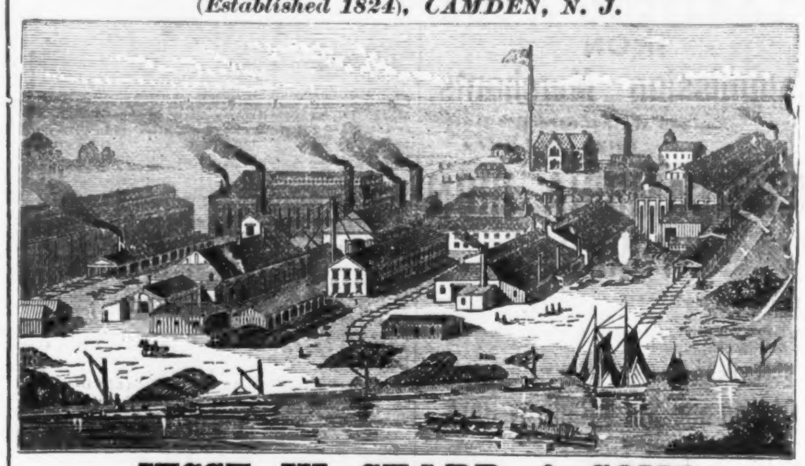
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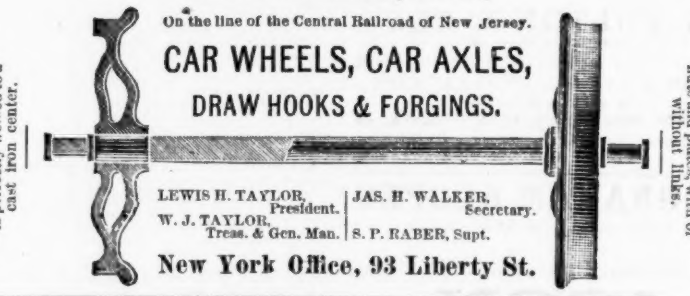
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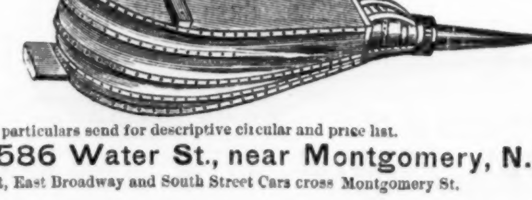
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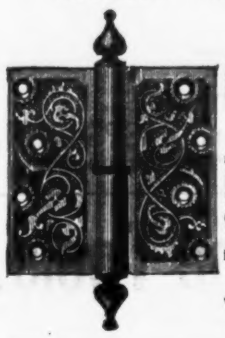

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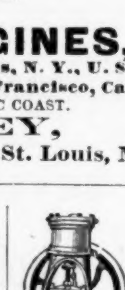

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Notes on Iron.*

By Thomas Morris, Manager of Dallam Forge, Warrington.

(Concluded.)

We have now arrived at the finished or merchant bar; and leaving the iron maker we will for a few minutes consult the engineer and theorist, and learn what they have to say. The theorist imagines that by repeated workings all iron must be improved in its quality. This theory is wrong. Engineers and others state that all iron is subject to singular and important changes in its structure, and becomes crystallized. The causes they give for this molecular change are vibration, percussion, heat, magnetism, frost, or extreme cold. Many of these gentlemen found their belief on the remarks of others, without making a single experiment or observation of their own. And, therefore, for our better understanding them I shall give you some extracts taken from the Transactions of the Institution of Civil Engineers, dated 1843.

Extract 1. Samples of broken axles were exhibited; some of them, being cut from different parts of the same axles, showed that at the journals, where the vibration was the most intense, the crystallization was increased to a great extent beyond what occurred in other parts of the same axles.

Extract 2. Mr. Moreland had frequently noticed that pins for chains, and pump rods, although of the best iron, would, if subjected to concussion, after a certain time, break suddenly, and that the fracture would exhibit a large crystallized texture. This was also frequently observed in the broken axles of road carriages, although they were generally made of iron of the finest quality.

Extract 3. Mr. Lowe stated that at the gas works under his direction wrought iron fire bars, although more expensive, were generally preferred; a pan of water was kept beneath them, the steam from which speedily caused them to become magnetic; he had frequently seen these bars, when thrown down, break into three pieces with a crystallized fracture.

Extract 4 is from the *Engineer* some three and a half years ago. A paper was read by Mr. Peter Carmichael, in which he gave the following as a reply he got from the makers of two boilers he wrote about: "From experience the firm found that all qualities of iron got hard and brittle after the boilers had been at work more than a dozen years, more especially when exposed to the action of the fire, and that in the furnaces, even Lowmoor or Bowling iron becomes as brittle as common iron in that time, and great care has to be taken in making repairs to prevent plates from cracking. For this reason they thought sixteen to seventeen years a long enough period for a boiler to be in use, at a pressure of 40 to 45 lbs. to the square inch. If used for a longer period the pressure ought to be lowered." I must not omit to say that Mr. Carmichael says that the plates had become very brittle although made of Glasgow best iron for shell, and for flues Glasgow best scrap.

These extracts give us opinions of the different purposes for which iron is used. And they imply that the iron was good and fibrous, that the iron manufacturer was of known repute, etc. All this is very good for the iron master, because it exonerates him from all blame, and in reality no blame can be attached to him if he has fulfilled the contract entered into between him and his customer. Now it is somewhat strange that not one of these extracts gives us any data, or proof to guide us in forming a reliable conclusion. Assuming that these gentlemen believed that the axles, the pins for the pump rods, or the crank pins, the grate bars, and the boiler plates were from well-known makers; that the axles did turn up nice and soft, showing a long turning, the pins forged well and turned up bright, the grate bars and the boiler plate were from best iron and best scrap, no man can say on looking at these finished articles that they were tough and fibrous, unless he had watched every working carefully, or had the adjacent scrap tested, and if he breaks the article he destroys it, and must replace it. However, the user has bought them, and these things must, and are, put to do duty. And when they have done duty, they have not all broken. No! for not one axle or crank pin in a thousand breaks, because they have become crystallized through vibration. Nor does the grate bar, because the steam has magnetized it; while the boiler plate becomes hard and brittle only so far as its atoms have been disturbed after leaving the mill and previous to being riveted up. But if one of these axles, tires, rails, crank pins, etc., breaks, though only one in a thousand, it is put down to vibration, extreme cold, excessive heat or magnetism, by those people who endeavor to account for every phenomenon, but who rarely succeed in proving anything.

If you require proof of my assertions, I give you what I consider proof, and invite discussion, in the belief that something may be learned from it. I have seen axles worn out, some of them broken at the journals, because worn under original size, which could scarcely be broken in the middle; and after breaking, the fracture shows the build of the pile or faggot the axle was made from. Some part of the fracture being beautifully fibrous iron, the other part crystallized. If vibration causes crystallization, how is it each particular part of the pile has not become the same? Scores of axles were bought by a firm not far from here for old scrap; they could not be reworked until they were cut into halves. The firm essayed to break them by pulling them up 15 ft. to 18 ft., and letting them fall on their middle across a piece of metal. This failed, with few exceptions. It was tried to break them by letting a ton weight drop upon them. This gave similar results, failing also; and had there been no other means of getting this very good scrap in half it would have been dear at a gift; therefore they were not brittle by vibration. The journal of an axle being the extreme end of the forging, gets too often more fire than it needs, and is therefore burnt at this part; this is the cause why some of the journals may be crystallized. I have seen thousands of tons of old rails cut up, some of which have been crystallized at one end, and fibrous at the other; some brittle throughout the entire length, and some fibrous; some in one fracture part fibrous and part crystallized, all clearly showing the manner in which the pile had been made up, proving to a demonstration that the rail maker knew where to put the inferior iron when making the pile for the rail. Tires in like manner present the same appearance as rails; therefore they are not crystallized by vibration.

The grate bar extract is as flimsy as possible, for who would pay Lowmoor price for grate bars? No one. The user wants a cheap wrought iron, and he gets a brittle grate bar, which is continually undergoing expansion and contraction and burning, and these are the causes of grate bars being brittle, and not magnetism. Mr. S. M. Saxby, R. N., some few years ago, found that imperfect welds and cracks could be detected by the magnet; this is very ingenious, but he could not make tough iron brittle by it.

The boiler plate is rather different to the other classes of iron taken. Some people argue that boilers vibrate very much when working, consequently become crystallized. Mr. Carmichael only ventures an opinion on those plates that are exposed to heat. My opinion is this: The plates, after leaving the manufacturer, and before being put in the boiler, are shaped to a required template, and just in proportion to the circle they are bent to, are the atoms of the plates disturbed by compression on the concave side and elongation on the convex side, sometimes to the extent of fracture. These fractures are so small at times as not to be visible to the naked eye; nevertheless they are there, and ultimately, by the continual expansion and contraction, the invisible becomes visible, and, unless the defective plate is repaired or taken out, may lead to something worse; not because the plate has become crystallized only so far as it has been compressed on the concave side, but because it would not stand bending to the desired form without injury.

There is another very important use iron and steel are put to, well worth our attention, and which I imagine will strengthen me in my conclusions, and that is the wire pit rope. That very flexible and ductile material, which is incessantly being bent backward and forward, continually in a state of tension and vibration, would not stand what is required of it for as many hours as it does months, if the numerous threads of wire comprising the rope were brought so close together as to form one compact bar.

The effects of extreme cold and frost on iron must not be omitted, for only two or three years ago, on the approach of winter, it was prophesied that the Bessemer rail would be doomed, inasmuch as it would become crystallized or cold short and break. Now, with all due respect to these theories on the causes of crystallization, I wish to affirm that neither vibration nor magnetizing by steam has any such effect on iron, and I will at once give you what I believe to be the causes of crystalline iron, and they are percussion or force of impact, compression or contraction, excessive heat or burning, and last, though not least, the practice of manufacturing finished iron from pig metal that has been made from iron ores containing phosphorus or silicium.

Take these causes seriatim. Impact does not granulate unless the bar under experiment or accident is nicked with a set, or has some flaw in it to start from, *i. e.*, if the bar or plate is tough to commence with. A bar was shown which would not yield to the force of impact until nicked, but after being slightly cut all round, and receiving a good blow from a sledge hammer, the piece flew off. The bar was afterward cut on one side, and then struck again with the same hammer, but instead of breaking off short and granular a beautiful fibre showed itself.

Again, in the case of armor plates, the force with which they appear to be struck should crystallize them, if percussion had the same effect under all circumstances. Compression or contraction is somewhat different, but is really a change brought about generally by mechanical agency. I have here a tough fibrous bar bent over in the form of a tuning fork, the outside fibres "give" and are elongated, while the inner fibres become so compressed as to burst and show crystals. Heating a bar hot and hammering it until it is black cold, is simply a bringing of the fibres closer together, causing like results. The threads of iron forming the wire rope are a sort of happy family. If any undue strain comes on one or two of them while passing over the pulley, the others give way and form a cushion to bed them in for the time being; their relation to each other is something like the strands forming a skein of thread. Not so with the fibres of a bar; for they would in a short time become compressed, and that causes crystallization. Thin sheet or iron for tinning would be of little use, if it was not annealed after leaving the rolls; being finished so cold when rolling, the skin is so compressed that on bending it would crack, but on putting the same in a furnace and heating to a red heat, it becomes very ductile, because the atoms of the iron through the effect of heat have become relieved and resumed their normal condition. On asking Mr. Mushet, the metallurgist, some few years ago, to explain the paradox I have here, the answer was, "When you anneal the sheet, if the annealing was long continued, you deprive it of carbon, therefore the annealed piece would contain less carbon than the piece you simply heated and then hardened in water." The thin iron before us was rolled from what is called puddled stock iron, and presuming Mr. Mushet's answer correct, this cold shortness is caused by the iron retaining its carbon; this wants proof by analysis; but this I can prove: the hard or cold short end is contracted, and becomes thinner than the soft end.

Some two years ago Mr. Brockbank, of Manchester, read a paper on the effect of cold and frost on iron, his theory, like many others, being that it caused iron to become brittle, and to corroborate his views he got several gentlemen to test iron for him at a time when the thermometer indicated below 32° Fah. Several gentlemen opposed his theory, and the result of the experiments did not carry with them convincing proofs. A learned professor, taking the lead in the opposition, afterward got a dozen darning needles and a lot of garden nails (cast iron), a most unsatisfactory material to obtain anything like certain results from; however, he found that the needles took a greater tensile strain at 12° than they did at 55°; the garden nails gave similar results; his general conclusions were that frost does not make either cast or wrought iron or steel brittle. Mr. W. H. Johnson, of Bowdon, tested a No. 4 charcoal rod, and he found that on the test piece being twisted slowly while surrounded with salt and snow, it stood 19½ twists; the adjacent 6 in. at 40° stood only 15 twists. These and other like experiments tend to prove what I contend for, that iron will bear a greater tensile strain the colder it is, but that its resistance to the force of impact is in ratio weaker. Why is this? for neither of these gentlemen tell us. Because the atoms of the iron are brought closer together by the contracting influence of extreme cold. The specific gravity is greater. It assumes more and more the texture of steel, which every one knows will not bear a heavy sudden blow without breaking, but try and pull its atoms asunder, *i. e.*, try its tensile properties, and you find it something astonishing.

Sir C. Lyell, in his "Principles of Geology," tells us that fine-grained granite expanded with 1 deg. Fahr. at the rate of 4825 ten thousand millionths, and sandstone 9532 ten thousand millionths, or about twice as much as granite. Professor Joule worked out the mechanical equivalent of heat, proved that a weight of 772 lbs. falling through a space of 1 ft. was able to raise a pound of water 1 deg. Fahr. If measurements half so nice as these were made on iron, it would be found that for every degree of heat lost, the iron shrank, and in exact proportion as the atoms are contracted so is its tenacity improved, and its resistance to the force of impact impaired.

Excessive heat or burning will crystallize iron, and cause it to break short when cold. So much was this theory relied upon a few years ago, that it was looked upon as impossible to make a large forging or finish any large mass without it being crystallized, owing to the lengthened time it must be in the furnace before it can be brought to a welding heat. This idea has exploded now, for with careful workmanship and a good fibrous iron to commence with, a tenacious plate has and still is being made in Sheffield for armor plating.

We come now to the primary cause of crystallization, which is the manufacture of finished iron from pig metal that has been produced from ores containing phosphorus and silicium. It is as impossible for us to produce the same quantity of iron from the oolitic or silicious ores as is produced from the hæmatite ores, as it was for the old alchemists to find the stone they dreamed of, which was to convert all base metals into gold. Hence, for the consumer of iron to expect the same article from different districts is a mistake, unless the native ore is disused and others imported, and this adds to the cost.

Nearly all manufacturing districts have their own specialties, cost invariably being in proportion to the quality. And many users of iron finding the cheap article suits their purpose, the manufacturer taxes his skill to avoid this cold short crystalline property. By judiciously mixing the pigs for the puddling process he attains his purpose, and produces for his customer the suitable common crown iron of commerce. This iron eventually becomes so much scrap, and is brought up for reworking into shafts and other large forgings; but the fibres that were developed by the first and second process are lost in this, its third reworking, and the metal becomes crystalline. It is generally expected that by repeated reworkings all iron improves; this is not the case.

An experiment is recorded in "Metals and their Alloys," where a tough fibrous puddled bar was taken and cut down and piled five layers high and rolled into a bar; a test piece was taken from this, the remainder was piled as before, and so continued until the iron had undergone twelve workings; the result was, it increased in tenacity from a tensile strain of 43,904 lbs. on the puddled bar, to 61,824 lbs. at the sixth working. After this the descent was in a similar ratio to the previous increase, and at the twelfth test it gave again 43,904 lbs. This instance tends to prove that if tough fibrous puddled bar to commence with will not improve only to the sixth working, weak or partly crystallized puddled iron would show depreciation much sooner.

A few words on the utility of iron, and I have done. I ask you to look on that monument of engineering skill that spans the Menai Straits; on that diamond looking structure at Sydenham, the one stiff and inelegant, the other full of graceful lines, tints and combinations, and fancy the impetus given to iron by such works.

Think of the wrought guns capable of throwing shot nearly 100 lbs. weight, and the war ships clothed with plates of iron 14 in. thick to receive them. See the minute indicators on your watch face, and the spider's web like hair spring that regulates them. And of what use would have been the electric telegraph without the wire rod? The various experiments and brilliant researches of Galvani, Volta, Arago, Ampiere, Oersted, Faraday, Wheatstone, and others, on electricity and magnetism, coupled with the labors of Cooke and Morse, who brought to a successful issue the means by which a thought may literally, in the words of the poet, "be wafted from Indus to the pole?" When I ponder these things, I am ready to exclaim "Upon my word, there's nothing like iron."

* Read at the Warrington Literary and Philosophical Society.

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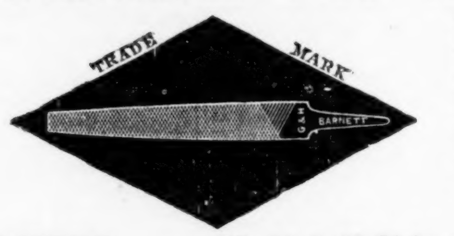

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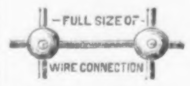

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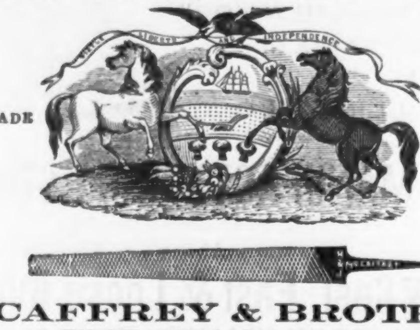

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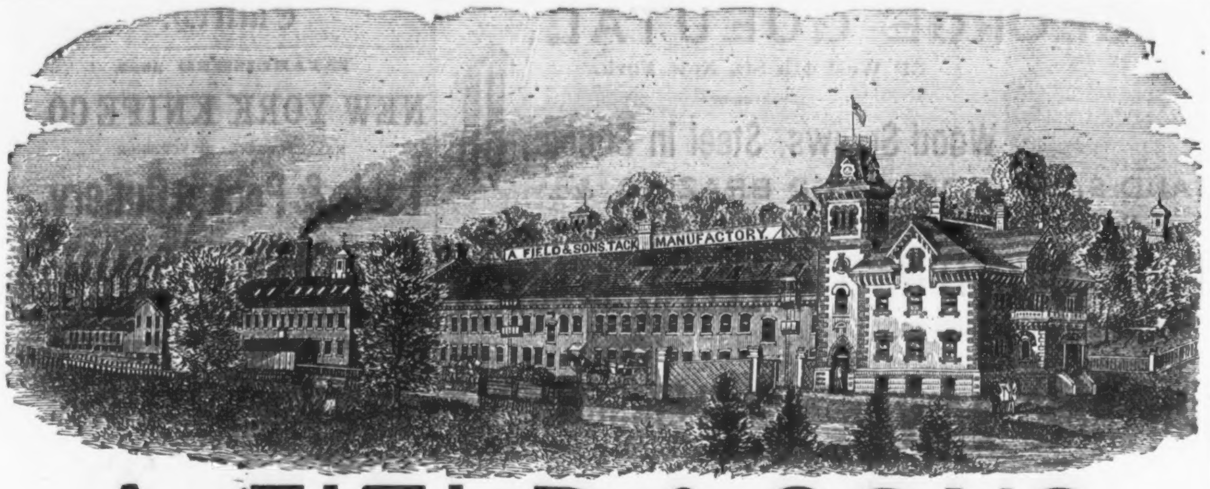

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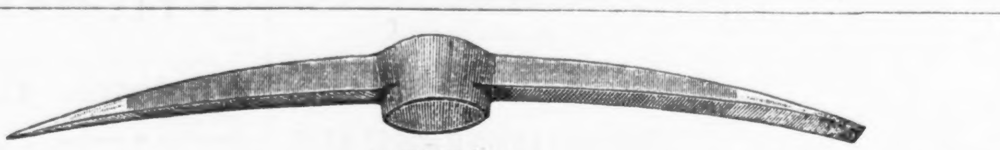
Any variations from the regular size or shape of the above named goods made from samples, to order.



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Iron Founders,

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Something New for

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New Union Steam Safety Elevator,

How One Works.

RIVERSIDE IRON WORKS, DEWEY, VANCE & CO.,
Wheeling, W. Va., January 14th, 1873.

Messrs. OTIS BROTHERS & Co., New York.

Dear Sirs: The experience of a year proves that *your Furnace Elevator is superior to all others in use.* We have in the six weeks from December 1st to Sunday last, 12th inst., made *2724 tons, 1401 lbs. Pig Metal,* or an average of near *65 tons per day,* which required the elevator to *lift 72 feet high* 4¼ tons Ore, Coke and Limestone for each ton of metal produced, or *more than 11,500 tons material in the 6 weeks.* The largest yield in *one* day was *81 1-4 tons* Iron, involving the lifting of *345 tons* material *in 24 hours.* This has all been done to *our satisfaction,* and that, too, in the *coldest weather we have had.* Other furnaces with *water* and *pneumatic hoists* have experienced *great difficulty,* on account of the *water freezing* in the *tanks;* and in the case of the *air* hoists, we understand that two furnaces, not far from us, *had* to *"blow out,"* from being *unable to hoist stock* during the *"cold snap."* The difficulty, we are told, was caused by the *condensed moisture* in the *blast freezing to the sides of the cylinders,* so that the *piston could not move* up or down.

Very truly, yours, DEWEY, VANCE & Co.

for Circular to

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BUSINESS ITEMS.

PENNSYLVANIA.

The rolling mill of Wilson, Glass & Co., at Pittsburgh, made during the month of January 123 tons of finished iron. The company have two heating furnaces for bar mill, one for guide mill and one for sheet mill, beside which there are nineteen puddling furnaces. During January the sheet mill worked on tank iron; this, in connection with a large stock of puddled iron ready made, enabled them to produce the above large amount

Sharon, Mercer county, has five blast furnaces, two rolling mills, two machine shops and two foundries. About 900 kegs of nails, 60 tons of hoop and bar iron, and 150 tons of pig iron are produced there daily.

The Pennsylvania Railroad Company have completed works at Altoona for the manufacture of steel and iron car wheels. The extensive car and repair works of this company, employing over 3000 men, are also located at Altoona.

The new iron furnace at Ringgold, Schuylkill county, was blown in on the 28th ult. It is said to be one of the most complete establishments of the kind in the State.

The Carlisle Furnace, at Boiling Springs, was built in 1771, and rebuilt twenty-one years afterward. It makes charcoal iron for ordnance, boiler plates, etc. The blast is driven by water-power.

Furnace No. 1 of the Stewart Iron Works, Sharon, is again in blast.

It is rumored that the Milton Car Works are to be removed to Harrisburg.

The Lehigh Car Manufacturing Company, of Stemton, will soon resume work, after having been idle since November last.

MASSACHUSETTS.

The Douglas Axe Manufacturing Company, East Douglas, manufacture axes and edge tools, and have been in operation 40 years. The capital is $400,000, and the works comprise twenty buildings. Three hundred hands are employed, the monthly pay roll averaging $17,000. The company use annually of raw material, 1200 tons iron, 275 tons steel, 1200 tons grindstones and 2400 tons coal. The annual value of the product is $750,000.

Charles Howard & Co., of North Bridgewater, are employing 40 hands in the manufacturing sewing machine needles, of which they turn out 150,000 a month. They expect to increase the product to 200,000.

The Hinkley Locomotive Works, at Boston, which have been working on three-quarter time for some months past, started on full time March 1.

The Atlantic Car Company has voted to reduce their capital stock from $121,000 to one-half that amount, by decreasing the number of shares one-half, and to raise $60,000 additional by issuing new stock.

By a recent vote of the New Bedford Copper Company the capital stock is to be reduced one-half, leaving it $250,000, in shares of $100 each.

OHIO.

The Ridgeway Iron Works, Youngstown, Wick, Ridgeway & Co., have recently been put in operation for the manufacture of railroad iron. The main building is 630x110 feet, beside which there are several other buildings, as piling house, smith shop, carpenter shop, &c. The firm use 400 tons of raw material per day, and will turn out 40,000 tons of rails per annum.

The Massillon Rolling Mill, now about completed, is for rent to responsible parties. Its capacity is eight puddling and two heating furnaces, with two engines.

The Lake Erie Forge Company, at Cleveland, is turning out 120 car axles per day, beside coupling links and pins and other forge work. There are in the shops 23 heating and seven boiling furnaces, four trains of rolls and eight steam hammers.

H. P. Straub, the manufacturer of the Queen of the South mills, Cincinnati, recently shipped one of them, as well as a bolting apparatus, to New Zealand.

The Belfont Mill, at Ironton, is running the forge department double turn.

The works of the Cleveland Boiler Plate Company are running with a capacity of twenty-five tons daily, and turning out monthly 250 tons of finished plate. The company run seven boiling, three heating and six knobbling furnaces, with a 4000 pound steam hammer, manufactured by Marchand & Morgan. They contemplate manufacturing bridge iron at an early day, and will employ about 100 hands.

The Phillips & Jordon Iron Works, of Cincinnati, have resumed work, but with less than the usual force. The present employes include none of the strikers.

It is expected that the repairs to the Alliance Rolling Mill, made necessary by the recent fire, will be completed and the machinery again in operation within a month.

The Union Mills, of Newburg, give employment to 700 men. The mills are situated about one-half mile apart, and running double turn. Both have thirty boiling and seven heating furnaces, two squeezers, six trains of rolls, muck bar and guide mill. They now turn out sixty tons of finished iron daily; the capacity is about eighty tons. The company have a furnace for the manufacture of pig iron. It is situated on the Atlantic & Great Western and Cleveland & Pittsburgh Railroads. In connection with the mills is a nut, bolt and chain factory.

ILLINOIS.

The Bellville Nail Mill, at Bellville, is running with a full force of hands. In one week, recently, forty-seven nail machines in this mill cut 2604 kegs of nails.

At Knoxville a new plow factory has been established.

INDIANA.

The reconstructed nail works at Terre Haute, start up with 70 machines, or 34 more than were run in the old mill.

MISSOURI.

The St Charles Car Works, at St. Charles, commenced operations March 1, with an order for 200 cars for the St. Louis and Iron Mountain Railroad.

CALIFORNIA.

The car shop, machine shop and several cars of the San Francisco and North Pacific Railroad, at Donohue station, were burned on the 19th ult. Loss, $50,000.

WEST VIRGINIA.

Messrs. Keller & Co. are building a forge for four fires at Capron Iron Works, Hardy county.

The Arlington Stove Works, of Joseph Bell & Co., at Wheeling, which were started in 1863, now turn out 50 stoves a day, against three or four a day when the works were established.

The Iron Trade at Other Points.

The Pittsburgh *Commercial* says:

The prospects for the spring trade, so far as the manufacturing interests of our city are concerned, are, upon the whole, of a promising and encouraging nature. Nearly all the iron and nail mills are running double turn. The daily consumption of pig iron is estimated at about fifteen hundred tons; although, if all our foundries, machine shops, etc., were in full operation, the consumption would, it is computed, reach two thousand tons daily. The manufacturers of steel are well supplied with orders, the machine shops having perhaps less work than almost any other branch of the iron trade of our city, owing to the fact that less new machinery is being built at present than for some years past. The products of our different manufacturers are being shipped as fast as they are turned out, and the stock of manufactured goods on hand is light, the general disposition being to produce only sufficient to meet the current wants of the trade. The margin for profits is close and the competition with other markets sharp. The policy of our manufacturers thus far has been, and will no doubt continue to be, such as to preserve and maintain the trade intact, which they did during, and have done since, the panic. The total product of iron, nails and steel in our city from the 1st of last September to the 1st of February, of this year, will probably equal that of the corresponding period of 1872-73. Perhaps in no other manufacturing center of the country has there, during this period, been so large and steady a trade as in Pittsburgh, and nowhere else has labor been so well paid, the manufacturers themselves being the parties who have suffered most. They are, however, confident of their ability to hold their own against other competing markets, and they look for a considerable augmentation of business as the season advances—the Northwest and Southwest, where the bulk of their products are sold, being financially in a better condition than for some years past, and the stocks in those sections being low.

The St. Louis *Railway Journal* says:

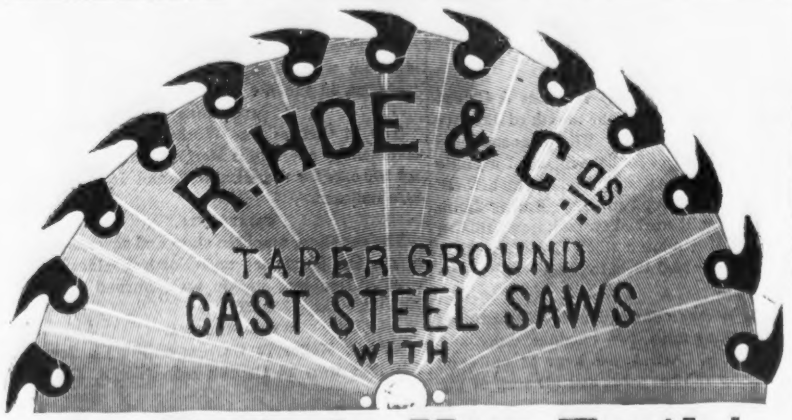
The movement of pig iron in this market is not only increasing in number of transactions and the quantity handled, but the market is becoming more settled and regular in its demand. The majority of sales heretofore have had a speculative character, from the fact that St. Louis was the cheapest Western market, much of the iron on hand at the close of 1873 bringing less than its cost of production. The labor question now is the most important one engaging the attention of our iron men, and is a very serious impediment to the resumption of the mills and furnaces.

The demand for Iron Mountain and Meramec ores is on the increase, and shipments are improving. The present week we note the sale of 20,000 tons of Iron Mountain ore for the Ohio Valley, 5000 tons of Meramec ore for the same destination. Inquiries from Troy, New York, have been received for 5000 tons of Missouri iron ores as samples.

In the Science Notes in *Chamber's Journal* for 31st January, we find the following: "A curious fact was mentioned at a meeting of the Newcastle-on-Tyne Chemical Society. Some five years ago, one of the great blast furnaces at Jarrow, when tapped in the usual way, poured forth nothing but slag. This was a surprise and a disappointment, for iron ore had been put in and iron ought to have flowed out. Repeated trials were made, but always with the same barren result, until at last the furnace was left to cool, after which it again became productive. Last year the furnace was pulled down and then the mystery was explained. The original bottom of the furnace had melted in the intense heat, the molten iron ran down and melted the clay in which the foundations were dug, and in the cavity thus formed a solid mas of iron, weighing 120 tons, was discovered. This was the iron that should have flowed out of the tap-hole. It had to be extracted in a more troublesome way, and was blown to pieces by dynamite.

New Safety Lock.—Prokop, of Graz, has constructed a lock on a new principle, which he claims renders it proof against picking or copying the key. The peculiarity, as gathered from a condensed description, consists in a keyhole curved upward instead of straight, with a corresponding compound curved key.

The British Society of Arts offers its gold medal, or $100, for the best "revolution indicator." It must be capable of showing the number of revolutions marine engines are making, at any hour of the day or night, without the necessity of counting or comparing with a watch. The first of June is the last day for competition.



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All kinds of Solid Tooth Circular Saws, Mill, Mulay, Gang, Drag and CROSS CUT SAWS.

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AMERICAN SAW CO.,

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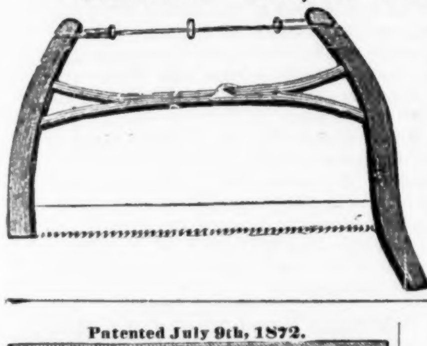
Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This especially the case with cross cuts having *Patent Teeth*. In the perforated saws **all gumming is avo . . .** and the teeth are easily kept long and in *proper shape*, saving *files*, *labor*, *expense* and *vexation* As is ell known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

Hankins' Elliptic Forked Saw Frame.



Patented June 28th, 1870.

The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any centre bolt, secures for the Frame great strength and durability.

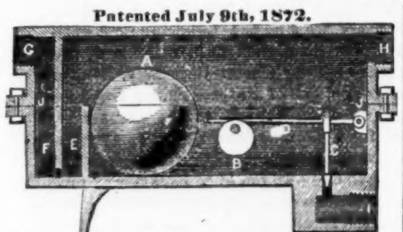
These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE

VULCAN SAW WORKS,

WILLIAMSBURGH, N. Y.

Patented July 9th, 1872.



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The only self-regulating Steam Trap in the world. For full description send for circular to

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Steam Heating Establishment, 150 S. 4th Street, Phila.

GENEVA HAND FLUTER

Manufactured by **W. D. TURNER & CO.** Geneva, Kane Co., Illinois. For Sale by GRAHAM & HAINES, 88 Chambers St., N. Y., Manufacturers' Agents.

GEORGE GUEUTAL,

39 West 4th St., New York.

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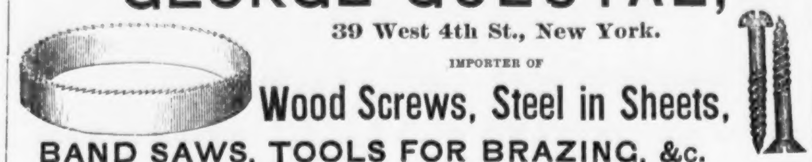

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BAND SAWS, TOOLS FOR BRAZING, &c.

Bed Screws, Pin Hinges, and Wire Nails a Specialty.

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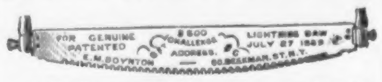
Manufacturer of

LIGHTNING SAWS.



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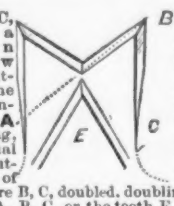
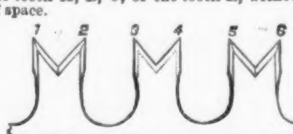
Our leading papers, such as the *Tribune*, *American Agriculturist*, *Christian Union*, etc., have published over sixty editorial notices recommending these Saws. Farmer's Clubs, Lumbermen, and Hardware Dealers unite in pronouncing the genuine Lightning Saw the greatest labor-saving implement of the age.

I have hundreds of letters from practical sawyers, voluntarily written, expressing their entire approval of these Saws.



A, B, C, represents a common drag saw tooth for cutting in one direction only, for wood sawing, and is equal to both cutting edges of the common V cutting tooth E, of same space. B.C. is equal in its direct action, to both faces of V tooth, consequently the two faces of my M tooth are B, C, doubled, doubling the cut of the tooth A, B, C, or the tooth E, without loss of space.



This is produced by dressing the two points of my M tooth, to cut in line so that the outside B, C, has four times the space of the slant edge behind it, or from 1 to 5, while slant has space from 1 to 2, the inefficient slant edges are thus practically concealed and do but slight surface cutting, while B, C, edges cut and clear simultaneously.

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E. M. BOYNTON, 80 Beekman Street, New York,

Sole Proprietor and Manufacturer.

N. Y. Saw Frame Co.

E. M. BOYNTON,

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I am sole proprietor and manufacturer of the celebrated **"Challenge" Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

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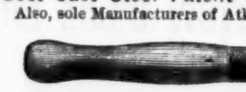

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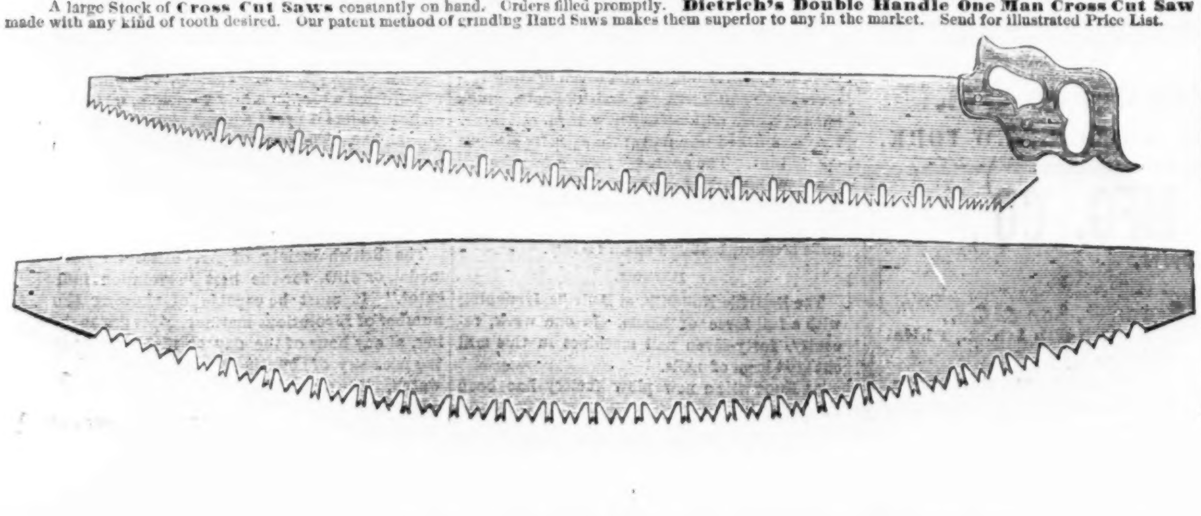

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New Patents.

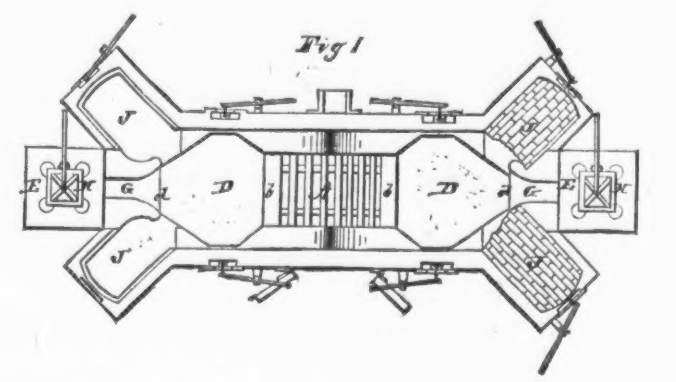
We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN REVERBERATORY FURNACES.

Specification forming part of Letters Patent No. 147,159, dated February 3, 1874, issued to Jonathan Ostrander, of Manchester, Va.

Figure 1 is a plan view, and Fig. 2 a longitudinal section, of my furnace.

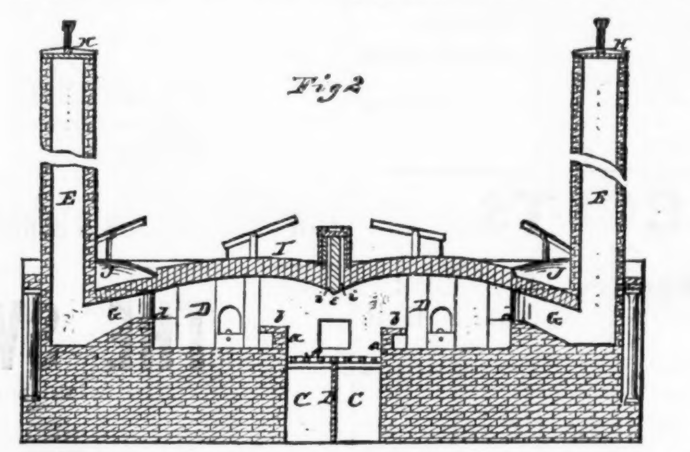
A represents the first grate, below which is a central vertical partition, B, forming two separate and distinct ash pits, C C. At each side of the grate A rises the fire wall *a*, with fire bridge *b* at the top, over which the fire passes into the two puddling furnaces D D. The fire on the single grate A divides and passes in opposite directions through the two puddling furnaces D D, and the smoke passes out through the chimneys E E at opposite ends of the double furnace. *d* is the flue bridge, and G the flue, to each chimney. The chimneys are provided with the usual caps H. I is the roof or top of the furnace, which projects downward in the center over the grate, forming a ridge, *c*, to facilitate the division of the fire and smoke in opposite directions over the furnaces D D. On each side of the ridge *c* is a series of apertures, *i i*, to supply draft to the fire, and through which also petroleum may be injected into the fire to facilitate combustion and increase the heat.



IMHROVED REVERBERATONY FURNACE.

In each ash pit C a blast should be introduced, one or both of which may be employed as one or both of the furnaces are in operation.

Each of the puddling furnaces D is provided with two of the usual heating stoves J J, one on each side of the chimney E, for the reception of the pig iron.



The invention is simply the combining of two puddling furnaces, each having two heating stoves and one chimney, with a single fire grate, so that one fire will supply both the furnaces.

By this arrangement the following important advantages are gained: The cost of erecting the furnace is considerably less than that of two single furnaces, each having a separate fire; room is economized, and a great saving in fuel is effected; there is also a saving in the cost of labor, as it will take less hands to attend to my double furnace than it will to two single furnaces.

Claim—The combination of two puddling furnaces, D D, each having two heating stoves, J J, and one chimney, E, with a single fire grate and fire.

IMPROVEMENT IN THE MANUFACTURE OF STEEL.

Specification forming part of letters patent No. 147,221, dated Feb. 3, 1874; issued to Thos. Brooks, of Canton, Ohio.

This invention consists of an improvement in the means of producing a "welded steel," or a steel of high grade, possessing toughness and malleability, and adapted to purposes in which a fine quality of steel is required, as well as to ordinary purposes, and at the same time will weld without the use of fluxes or chemicals; also in the production of a steel of great fineness, and great toughness, or tenacity, that will weld without the use of a flux.

The means used for these purposes are the following: Take seventy-six pounds of bar iron, half an ounce of tungstate of soda, eight ounces of spiegeleisen, eight ounces of charcoal, and three quarters of an ounce of manganese, and subject them to the usual treatment employed in converting processes in a smelting pot. These proportions may be varied to suit the grade or quality of the iron employed, and the quality of the steel to be produced.

Claim—1. The use of tungstate of soda, spiegeleisen, charcoal, and manganese, in the manufacture of steel.

2. In the process of converting iron into steel, the use of tungstate of soda, substantially as described

A Fire in Yeddo, Japan.

A correspondent, writing from Yeddo, sends the following interesting account of how they manage a conflagration in that city: A little past midnight on the night of the 31st of December the fire-bells of Yeddo rang in the new year. The remembrance of the great fire of the 9th of December was still fresh. The brilliant light in the center of the city spread consternation. The bells were rung in every quarter, and in a little while all Yeddo was awake. The night was intensely dark, and the snow falling heavily. The streets were blocked with the crowd. The police, however, were soon on the ground and cleared the space in front of the temple. No one but firemen, officers and foreigners were allowed to pass beyond the outer porch. The temple was built of the finest wood, and the heat was so intense that the snow, for several hundred yard, was turned into rain. For an hour after the first outbreak an enormous jet of unbroken flame, singularly varied in color, owing to the fusion of different metallic substances, sprang upward like a volcanic discharge, and threw a glare over the city, such as no one of this generation had ever before seen.

The firemen were there in full brigades, but they were powerless to save the temple. At 1:30, when the whole building seemed wrapped in flames, the front wall beneath the eaves fell outward, disclosing what at first view was only a mass of lurid flame and eddying smoke. But presently out of it came the outline of a row of human figures, standing immovable upon the interior platform of the temple. When the smoke lifted these became distinctly visible. They were the leaders of the fire brigade, perhaps some fifty in number, posted in a double line, grasping their strange standards and surveying the scene with the stolidity of statues. With their uncouth head dresses, parti-colored clothes and livid faces, all set in a blazing frame work, which swept around them and scorched the emblems they held, they made a weird and unearthly picture. Over and over again a curtain of fire passed between the motionless figures and the spectators. It was a real drama, but a reckless exposure of life which at any time might have become a tragedy. They stood until a part of the roof had fallen in, and then withdrew by ways known only to themselves. Presently they reappeared in the gallery of the lofty gate, where they presented an aspect as weird as before, though no longer surrounded by exciting peril. It is said that these leaders assume these positions of danger to stimulate the zeal and hardihood of their followers.

When the massive roof fell the crash was as thunder, and a mass of pure flame reached up a hundred feet. At 3 o'clock the burning belfry attracted attention. The bell became red hot, and a little later fell from its timbers, and is said to be irretrievably ruined. It was one of the largest bells in Japan, being ten feet high, five feet eight inches in diameter, and one foot thick.

The temple is supposed to have been set on fire by some Buddhist priest, as its worship had been changed from the Buddhist to the Shinto faith. Since its destruction the ruins have been inclosed with a high fence, and no one allowed to visit them.

Frosting for Ornaments of Metal, Plaster, Iron, Glass, &c.—Not long since there appeared in the show windows of Munich certain artistic figures and ornamental objects, which were remarkable for their beautiful silvery appearance. They attracted a good deal of attention, both on account of their beauty and novelty; and the curious German—for curiosity is not limited to the inquisitive Yankee—could not rest until he learned the secret of their manufacture. It seems that the objects were only plaster casts, but were covered with a silvery film of colorless and finely-divided mica. Mica has long since replaced the bronze colors in certain manufactures, so we are not surprised at its being used for this. After experimenting some time, Schelhass found that this silvery appearance could be given to the object in the following simple and inexpensive manner: Plates of mica are first rendered perfectly clean and white, either by boiling in muriatic acid or by igniting them; they are then washed, dried and ground to a fine powder, which is carefully sifted, or elutriated, and mixed with very thin collodion. It is now ready to be applied like a paint or varnish with a soft pencil, two or more coats being given until of the desired thickness. The objects thus coated have a silvery appearance, and possess one advantage over those in which tinsel or a metallic bronze is employed, not being at all affected by sulphurous vapors. They are not injured by dust and dirt, and may be cleaned by washing in water. Collodion adheres firmly to glass, porcelain, wood, metal and paste-board, and as mica is capable of taking any desired color, this furnishes a cheap and excellent method of covering toys and objects of *vertu*, and increasing their beauty.

Portable Gas Machine.—The steamer Celtic, of the White Star Line, is lighted with gas made in an apparatus manufactured by Messrs. Porter & Co., of Lincoln, which is capable of supplying three thousand lights. The apparatus consists of the retort stack, washer, condenser, scrubber and gas holder, contained, including room for stoking and working, in a space of 1600 cubic feet. The retort stack has three retorts set over two furnaces, so that either one, two or three retorts may be worked. The ovens and flues are so arranged as to secure the thorough heating of the whole exposed surfaces of the retorts, which are of peculiar shape, and the lids are provided with diaphragm pendants, so that the oil issuing from the syphon feed pipes must of necessity be distributed over the heated surface and volatilized instantaneously. The brick work is enclosed in cast iron plates constructed to prevent radiation, and the whole is so arranged that any part of the stack may be inspected without interfering with the other parts. The washers, etc., for the purification of the gas after it leaves the retorts, are provided with overflow pipes, so arranged that however heavily the ship may roll, the water is maintained at a uniform level. The holder is a combination of holder and tank, the holder passing so completely into the tank when empty as to leave no waste space for gas which cannot be expelled, and, when full, holds double the quantity of gas usually contained in one of the ordinary construction. An indicator is provided, by which the supply of oil to the retorts may be regulated. On leaving the holder the gas passes through a governor, which gives an uniform pressure at the burners.

The Wilkesbarre Mine Fires.—A Wilkesbarre dispatch says that on Monday, the 2d inst., the miners who have been for the last two months fighting the fire at the Empire mine, near that city, ceased work, having become convinced that their efforts to control the fire were becoming more hazardous and unavailing each day. Toward evening a most extensive "cave in" of the mine occurred, exceeding in extent the fall at the Baltimore mine, which took place a short time since. Great consternation prevailed in the neighborhood of the mine, and families were preparing to leave the dangerous proximity. The fire now has free scope, and threatens to ruin utterly one of the most valuable possessions of the newly formed Wilkesbarre and Lehigh Coal Company.

The Wilkesbarre *Record* says: On Monday about five or six acres, situated between the Kidder and the Hollenback, caved in; but no accident occurred, as the men had all left, being forewarned by the gradual tottering of the pillars. The matter was kept quiet, and those living in close proximity knew nothing of the affair. The eight o'clock shift returned to work last evening and the other shifts have been duly notified to be prepared to resume their work, as all danger is now over, and the men can work with much more safety than before. What effect the "cave" will have on the fire, remains to be seen.

The Ohio *State Journal* says: We have a specimen of extra No. 1 foundry iron from the blast furnace of the Franklin Iron Company. It is of the description running every day, and is pronounced by the best of judges to be of the very best quality. The following are the proportions used in the manufacture: Two-thirds Lake Superior ore, and one-third of native ore; two-thirds Straitsville coal, and one-third Connellsville coke. There is no longer a question about Columbus producing the best of iron, a fact that is receiving extensive recognition from consumers at home and abroad. The native ore necessary in the manufacture of foundry iron is near at hand. And there is but little question about a good furnace doing regular and first-class work, if it be under the management of such a man as John Patton, the founderyman of the Franklin Iron Company.

Improved Sheet Metal Boxes.—An improvement in the manufacture of sheet metal boxes has been recently introduced by A. Browne, London, England, which presents some novel features. The invention consists in making certain parts of thin sheet metal boxes, namely, the hinge and the spring catch. First, by bending the edge of the back of the box and cover over a piece of wire so as to form a hinge; and, secondly, in bending over the front edge of the lid, or cover, and also bending the top edge of the front part of the box, so that when the lid is forced down it forms a secure spring fastening.

At the Creuzot Iron Works, in France, owned by Messrs. Schneider & Co., there are 15,500 workmen employed. These works produce annually, it is affirmed, 50,000 tons of steel rails, 30,000 tons of iron rails, 100 locomotives, and other machinery. Twelve blast furnaces are in operation, making ordinary and Bessemer pig metal.

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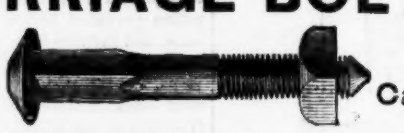
Buy the Best.



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Best Bolt manufactured for all kinds of agricultural machinery. Will not split the wood, and can not turn in its place.

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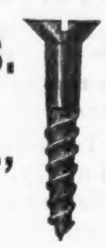

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Button Head.

QUALITY GUARANTEED.

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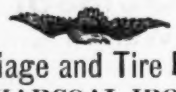

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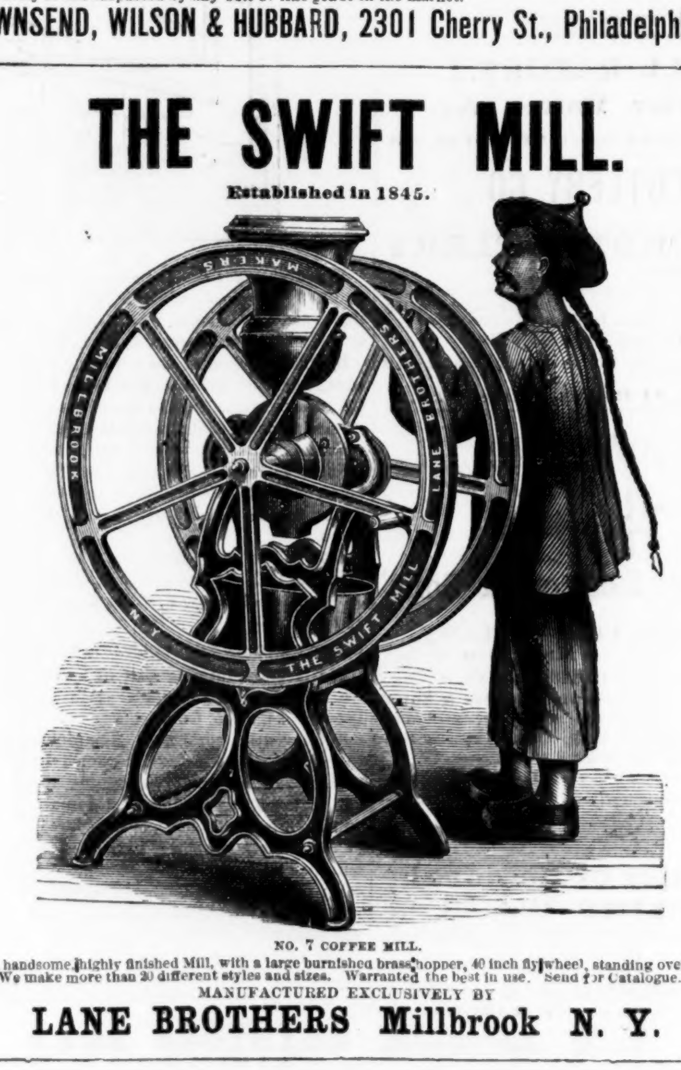

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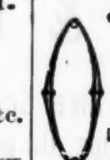

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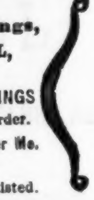

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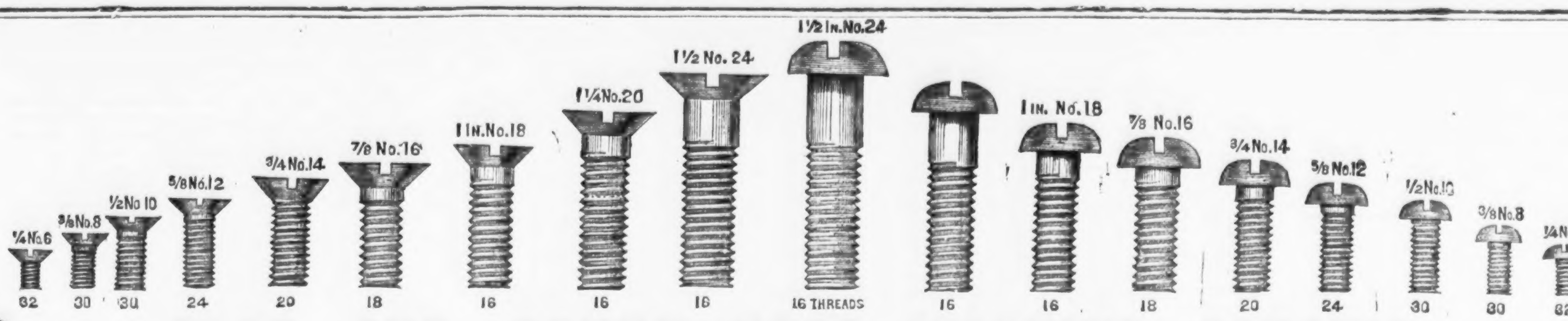

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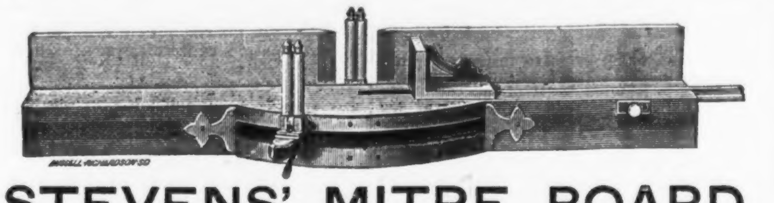

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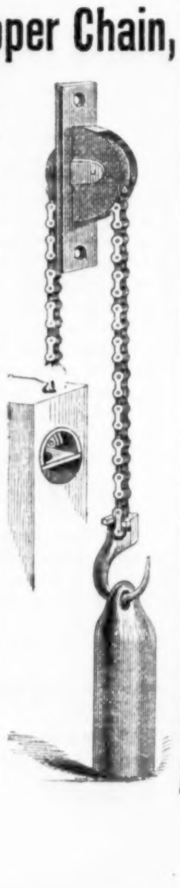

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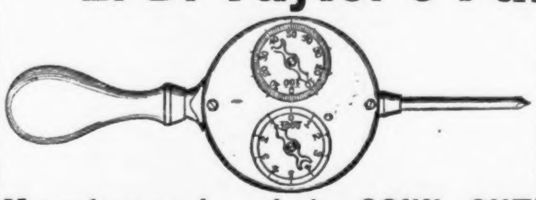

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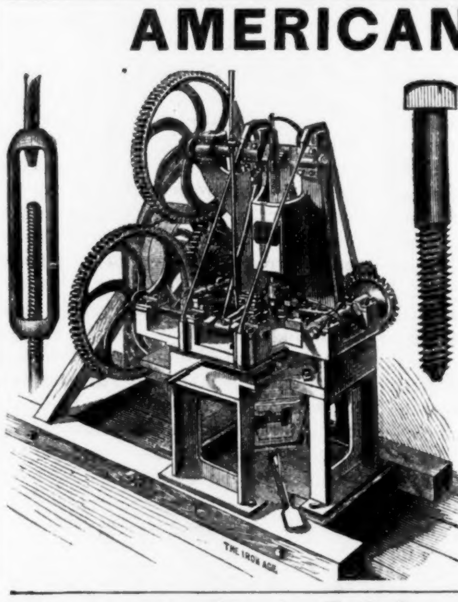

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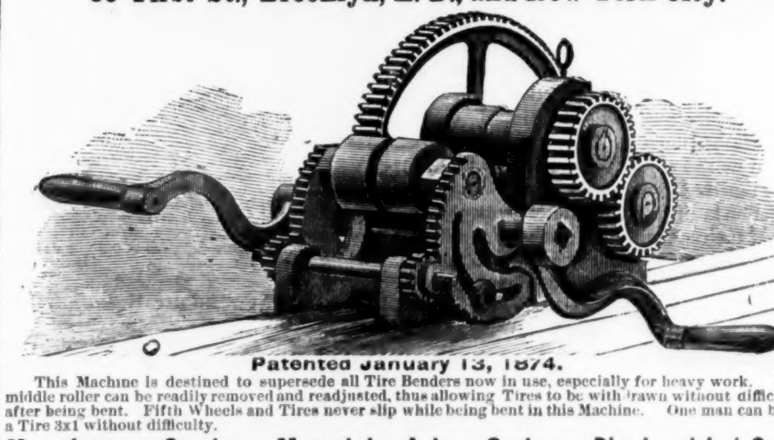

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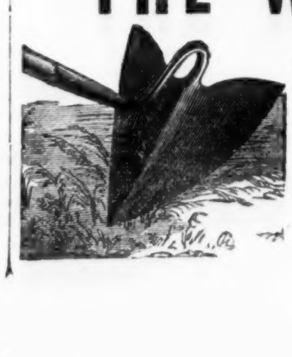

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New York, Thursday, March 12, 1874.

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JAMES C. BAYLES . . . . Editor.
JOHN S. KING . . . Business Manager.

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CONTENTS.

The "Emancipation of Labor."

It is curious to notice the strong development of the tendency to organization among the class of men who know just enough to make their ignorance dangerous. For example, a society, intended to be national, has lately been organized under the name of "The Association of United Workers of America," for the purpose, we are told, of accomplishing the "emancipation of labor" and the "abolition of class rule." Branches have been started in several States. No persons who have been known as "professional" politicians, or who gain a living by politics, are admitted into the society. Every section must be composed of at least three-fourths wages laborers, and no one can be accepted as a member against whom five votes are recorded. Before being admitted to membership, the candidate is required to take a pledge to support the principles of the association, and solemnly disavow all alliance with existing American political parties, or with any other American political party that may be hereafter established which shall not aim at the emancipation of labor.

We have no intention of saying anything which may tend to discourage the workingmen from joining this association, but should very much like to know exactly what is meant by the "emancipation of labor" of which we hear so much nowadays, and if the Association of United Workers will publish a circular, or a proclamation, or some other document, stating in comprehensible language what labor is to be emancipated from, we shall be under lasting obligations. If it be, as we suspect, the desire of this association to emancipate the laboring classes from the necessity of working for a living, we are afraid it will not succeed. If, on the other hand, the association proposes to effect the emancipation of labor from the tyranny of the trade unions, there is a very good chance of its accomplishing what it undertakes. As we are in doubt upon the subject, however, we will not venture any opinions as to what it is the association proposes.

Perhaps, however, it would be profitable for those who are most actively interested in the formation of workingmen's organizations, to consider, now and then, whether the emancipation of labor is not a problem which is working itself out to a satisfactory solution, though in another way from that proposed by demagogues and socialists. To us there is something grand in the thought that, during the brief period of half a century which has witnessed such rapid progress in the improvement of labor saving machinery, so large a share of the burden of toil has been lifted from shoulders of flesh and laid upon shoulders of iron; that mechanical force is employed where formerly vital force was wasted, and that man's power to create is no longer limited by the measure of his physical strength and endurance. In every department of industry we see hard labor supplemented or suspended by machinery, and every year a larger proportion of those held in the bondage of exhausting toil are emancipated in the truest and broadest sense, and elevated to higher duties. In mill, workshop and factory, machinery is lightening labor and cheapening production; in mine and tunnel the steam engine and machine drill do quickly and cheaply the work once performed at so much greater cost of life and health; on the farm the soil is broken, the seed planted and cultivated, and the harvest gathered by machinery, enabling the husbandman to bring a much larger area under cultivation, and to increase his production of cheap food without withdrawing labor from other and higher occupations; in the household, machinery of a simpler, but not less useful, kind relieves our wives and daughters and servants from much of the drudgery which formerly fell to their lot; in the warehouse, on the wharf—everywhere, in fact—machinery renders some service once performed by toiling men and women. Iron and steam have become as muscles that never tire and blood that never runs dry in the metal veins through which it moves.

When we speak of the "emancipation of labor" in connection with the mechanical progress of the present century, we use the term in a sense in which it means something. Whatever facilitates and cheapens production tends to elevate labor above mere drudgery. The more machinery a nation has in operation the more fully and profitably is its labor, skilled and unskilled, employed, the more rapid its material progress and the higher and more evenly developed its civilization. The workingmen may sometimes think that machinery is the selfish and exclusive agent by which capital enriches itself at the expense of labor; but were the work now performed by countless unwearying hands of iron and steel again transferred to hands of flesh, they would pray more loudly than now for the "emancipation of labor." It is not the fluent speakers who promise the workingmen impossible good in the future, and who denounce capital as a tyrant that holds labor in thrall, that will lead it to fuller freedom, but it is the thoughtful men who, often unrecognized as benefactors of the race, are perfecting our labor-saving machinery and improving the tools with which labor works. The time is coming when the function of the hand in production will be merely to supplement the labor of the brain; but let no man, whatever his station in life, delude himself with the idea that the time will ever come when idleness will prosper or unthrift grow rich, or that the human race will ever be "emancipated" from the necessity for labor.

The Senate and the Centennial.

The action of the Senate upon the Centennial cannot be said to redound much to the credit of that body. For some reason not yet satisfactorily explained, and which we are at a loss to understand, the idea of an international celebration has met with persistent opposition from a majority of that body. They are willing enough to vote an appropriation in aid of a national industrial exposition, but the idea of inviting the friendly co-operation of foreign powers excites the liveliest indignation; and the bill, as finally referred to the appropriation committee, merely requests the different States to take part, but gives the President no authority to invite the participation of foreign powers. This does not nullify the existing legal provision for an international celebration, but it tends to cast discredit upon the enterprise abroad, and will unfavorably affect the success of the great undertaking. This is much to be regretted. We need a great, successful and well conducted international exposition to efface from the memory of foreign nations the scandal which attached to the management of the American Department at Vienna. However, the Centennial bill is not as badly mutilated as some of its active opponents hoped it would be. If it passes in its present shape, the Centennial will be a success in spite of the efforts which have been made to insure its failure.

Correction.—In the editoral article on the European Tin Markets, which appeared in the last issue of *The Iron Age*, occurred an unfortunate error which calls for correction. We spoke of the London market as having "fallen to £97, and Amsterdam to 87 guilders per ton." We should have said the London market has fallen to £97 per ton, and Amsterdam to 62 guilders per 50 kilos. The error occurred in making a hurried translation. It was so obviously wrong that no one acquainted with the value of tin and the value of a guilder could have been misled by it, especially as reference was made to a telegram published in another column, in which the prices at London and Amsterdam were correctly stated.

A good deal of discussion having been raised during the past two or three years as to the effects of Codorus ore upon pig iron in the puddling furnace, and a wide diversity of opinion existing on the subject among scientific and practical metallurgists, it is, we think, desirable that those who are interested in the introduction of Codorus ore, and in the sale of rails, &c., made with it, should take some means of determining, by mechanical tests and chemical analyses, what the metal—commonly called Codorus steel, and sometimes miscalled silicon steel—really is, and whether the action of the Codorus ore in the puddling furnace is beneficial to the iron or not. Our information, derived from many sources, leads us to believe that the rails rolled with Codorus steel heads have done good service, and that, if not as good as solid steel rails, they are a great deal better than the average of iron rails. There is, however, no authority for this statement except the reports of railroad superintendents and directors, and those who are not disposed to accept these statements can usually find a good excuse for not doing so. Those interested in introducing the ore or in selling rails made with it, have claimed a great deal for the metal—too much, perhaps, in some instances—and it now remains for them to show what it is and how it compares with other irons costing as much to make into rails. There will be no certainty in the matter until the whole subject has been referred to experts of well known character and scientific ability to examine and report upon; and until such a report shall have been made it is to be expected that a great deal of doubt will exist in the minds of iron makers and railroad managers, as to whether it is possible to improve the quality of iron in a puddling furnace, by merely mixing a quantity of highly silicious ore with the charge.

The Steel Tariff.

The following letter has been sent us with a request that we will publish it. We do so with pleasure, but as we said last week all we have to say on the question, no comments are necessary:

NEW YORK, March 9th, 1874.

To the Editor of The Iron Age—SIR: Referring to your article of 5th inst. allow us to reply: The present steel duties, reduced to their lowest terms, are as follows:

Up to and including 7c. per lb. value, the duty is specific 2 25-100c. per lb. Thence up to and including 11c. per lb. value, the duty is specific 2 7-10c. per lb. Exceeding 11c. per lb. value, the duty is specific 3 15-100c. per lb., and, in addition, 9 per cent. *ad valorem*.

We repeat, therefore, that your description, viz.: "The various grades * * * to pay specific duties "at so much per lb., according to quality, is applicable to the *present* tariff on steel, and we join with you heartily in condemning it. It is neither *ad valorem* nor purely specific, but partakes of the nature of both modes, involving the evils of both modes.

IMPORTERS.

New Publications.

STUDIES OF BLAST FURNACE PHENOMENA, by M. L. GRUNER, President of the General Council of Mines of France, and late Professor of Metallurgy at the Ecole des Mines. Translated by L. D. B. GORDON, F. R. S. E., F. G. S., &c., Philadelphia, HENRY CAREY BAIRD, 1874.

Mr. Gruner's writings on metallurgy are so well and favorably known to American iron masters, that a work on the chemical phenomena of the blast furnace requires no other introduction than his name upon the title page. The work before us is his latest and perhaps his best contribution to the literature of iron metallurgy. It cannot be considered in any sense a popular treatise. It requires to be read with care, and to understand and appreciate it the reader must have given some attention to the subject of which it treats, and know something of mathematics; but those who will take the pains to read carefully and understandingly will find in it much valuable and exact information bearing upon the question of how the cost of making a ton of pig iron may be reduced to a minimum. Of course M. Gurner makes no attempt to answer this question specifically, but he has so generalized the results of observations and experiments as to give formulæ by which the chemical and physical elements of the question may be answered approximately, *i. e.*, by ascertaining the proportion of carbonic oxide to carbonic acid present in the escaping gases of any furnace of which the charge is known. These studies derive their chief interest from the fact that they give precision to the theory, first distinctly taught by Mr. I. Lowthian Bell, that the ratio of $\frac{CO^2}{CO}$ in the escaping gases is the index of the working of the furnace. M. Gurner further treats of coal economy, the influence of the hot blast, the proper hight of furnaces for economical working, and many other subjects of interest and importance. As showing the drift of the author's reasoning, we quote the following, which he gives as his general conclusions reached from careful study of the furnaces of the Cleveland district:

1. The production of blast furnaces beyond the capacity of 7000 cubic feet, does not increase in proportion to that capacity.

2. To appreciate rightly the working of blast furnaces, it is important to determine by experiment the ratio $\frac{CO^2}{CO}$ in the escaping gases. By help of this ratio we cannot only calculate the true composition of the gases, but also the weights of blast necessary for the furnace.

3. To determine exactly the ratio $\frac{CO^2}{CO}$ it is not sufficient to draw off a certain number of samples taken from time to time instantaneously. The gases must be drawn off for several hours, and for this purpose it will be well to have recourse to an apparatus analogous to that used by Mr. Scheurer-Kestner in his analysis of the products of combustion of coal under steam boilers.

4. Once the composition of the gases is known, if we would render an exact account of the working of the blast furnace, we must establish a balance between the caloric received and the caloric expended, and estimate separately the caloric developed in the zone of the tuyeres, and that which is produced in the zone of reduction.

5. In the application of these principles to several blast furnaces of Cleveland, we have found that the advantages of very high furnaces over low furnaces result simply from the lower temperature of the upper parts of the body of the furnace. Reduction goes on more perfectly and completely by the action of CO alone, without intervention of solid carbon. We approach the ideal working, which supposes the solid carbon burned exclusively by the oxygen of the blast. An additional advantage, and more direct, is the less amount of sensible heat in the escaping gases.

6. The consumption of blast furnaces depends partly on their yield. The minimum consumption corresponds to a mean speed of descent of the charges, and this varies beside with the hight and absolute capacity of the furnaces.

7. By reason of the dissociation of the CO in the upper region of blast furnaces, the temperature of the escaping gases cannot descend below a certain limit, and on this account there is no advantage from the time this limit is attained in enlarging either the capacity or hight of the furnaces. A very slow rate of working and an excess of capacity are prejudicial.

8. The caloric carried in by the hot blast replaces advantageously what is developed in the zone of the tuyeres. The relative economy due to hot blast decreases as the temperature is made higher. In practice there seems to be no real economy after the limit of 700° to 800° has been reached. The hot blast tends to raise the ratio $\frac{CO^2}{CO}$, and by cooling the upper regions of the furnace it favors reduction without consumption of solid carbon; that is, the ideal working of the apparatus.

The publisher's notice accompanying the volume states that it will be sent, post-paid, to any address for $2·50.

REPORT ON THE GEOLOGICAL SURVEY OF THE STATE OF MISSOURI, 1855-1871, BY G. C. BROADHEAD, F. B. MEEK AND B. F. SHUMARD. PUBLISHED AT JEFFERSON CITY, 1873, BY AUTHORITY OF THE LEGISLATURE.

PRELIMINARY REPORT ON THE IRON ORES AND COAL FIELDS OF MISSOURI FROM FIELD WORK OF 1872. N. Y., JULIUS BIEN, 1873.

These two works, with accompanying atlas, form a very valuable contribution to our information concerning the mineral resources of the State of Missouri. They give a very full and carefully compiled account of the vast deposits of iron, coal, copper, lead, limestone, and other minerals with which that State abounds, with numerous tables of analyses, and are very liberally illustrated. The atlas which accompanies them is of a very high order of merit, and evidently executed with great care. We have not had opportunity as yet to make more than a hurried examination of their contents, and shall speak of them more fully in a future issue.

KNIGHT'S AMERICAN MECHANICAL DICTIONARY; Being a Description of Tools, Instruments, Machines, Processes and Engineering; History of Inventions; General Technological Vocabulary, and Digest of Mechanical Appliances in Science and the Arts. By Edward H. Knight, Civil and Mechanical Engineer. New York: J. B. Ford & Co.

It is not often we can speak with entire approval of books published in monthly parts by subscription. In too many instances this method is resorted to as a means of selling books which few people could be induced to buy if offered complete, at the price which the publisher would have to charge—usually a great deal more than the book is worth to any one who would be apt to buy it. In this instance, however, we believe we have a publication of real value to the manufacturer, the mechanic, the artisan, the farmer, the student, the man of business—all, in fact, who cannot afford large and well selected libraries of works of reference, and who need exact information in the most condensed form. The seven parts of this work which have already reached us we have carefully examined, and we believe it is exactly what it claims to be. It is an entirely new work, both in conception and construction, and the long experience of the author in the preparation of patent specifications for the United States Patent Office, has taught him the art of conveying an idea in the fewest possible words. We are informed that Mr. Knight has been engaged in collecting the materials for this work for the past twenty-five years. The complete dictionary will contain 5000 engravings, illustrating the machines, tools, devices and systems described in the text. The work is issued in parts, at 50 cents each, and will be completed in 28 or 30 parts.

A SHORT TREATISE ON THE COMPOUND STEAM ENGINE. By John Turnbull, Jr. New York: D. Van Nostrand, 1874.

This little work forms No. 8 of Van Nostrand's Science Series, and contains a new method of finding the relative areas of the two cylinders in a compound engine, beside other information of a valuable character to engineers. The work is illustrated with diagrams and tables.

MAP OF THE MINERAL RESOURCES OF CHATTANOOGA AND VICINITY. By S. B. Lowe, Chattanooga, Tenn., 1873.

This is a very well executed lithograph of a map, evidently prepared with great care, by Mr. Lowe, proprietor of the Vulcan Iron Works, and cannot fail to be of great value to those interested in the mineral resources of the district. The map shows the position and area of the deposits of coal, iron, copper and slate, and the various avenues of communication by navigable rivers and railroads. The size of the map is 27 by 36 inches, and it is a very excellent specimen of lithographic art. It is sold by subscription at $5, mounted or in covers for the pocket. We commend it to the favorable notice of those interested in the mineral resources of this section.

UNITED STATES TEXTILE MANUFACTURERS DIRECTORY. Boston. Published at the office of the National Association of Wool Manufacturers, 1874.

This work has been prepared to supply a demand existing for a correct list of the manufacturers of textile fabrics throughout the country; and gives its readers, in addition, a number of valuable statistics concerning the production and consumption of materials relating to this branch of trade.

THE INTERNATIONAL REVIEW, Vol. 1, No. 2. A. S. BARNES & Co., New York, March, 1874.

The present number contains several articles of great interest, notably one on the "Working Classes in Europe," by Hon. Thomas Hughes, M. P., and a carefully studied article on "Upper Schools," by Dr. McCosh, of Princeton, N. J. The number also contains papers by Philip Gilbert Hamerton, who writes on Practical Work in Painting; Hon. Amasa Walker, on Our National Currency, and other well known writers.

APPENDIX TO SWINEFORD'S HISTORY OF THE LAKE SUPERIOR IRON DISTRICT, BEING A REVIEW OF ITS MINES AND FURNACES FOR 1873. Marquette Mining Journal Office, 1873.

This little volume is an interesting addition to a valuable book, and brings the history and statistics of the Lake Superior iron district down to the end of 1873. The statistics of copper and silver are also presented, with interesting information concerning new local industries.

Scientific and Technical Notes.

It is well known that the

WEATHER WASTE OF COAL

is often very considerable, but few, probably, know how great it is. Dr. Varrentrass has ascertained a loss of more than one-third in the weight of a sample of coal exposed for some time to the air, and he states that the quality of the coal had undergone a still greater deterioration. The loss is due to a slow combustion of the volatile elements of the coal, which gradually diminish in amount, whilst the proportion of carbon, ash and sulphur are increased. In some experiments made the gas furnished diminished 45 per cent., and the heating power 47 per cent. in a coal which had been exposed, and the same coal under shelter lost only 25 per cent. as a gas generator, and 10 per cent. as a heat producer. Anthracite, as might be expected, suffers least from exposure to the atmosphere, and the bituminious coals are those which lose most.—*Globe.*

At the Wyandotte Rolling Mill, Wyandotte, Mich., a number of interesting

TESTS OF CHAINS MADE FROM LAKE SUPERIOR IRON

gave the following results:

Size.	*Quality.*	*Strength by test.*	*Dif. favor Am. chain.*
1 ¼ inch	American	101,750	
1 ¼ inch	English	74,500	25,250
0 ⅝ inch	American	26,875	
0 ⅝ inch	English	19,000	5,875
0 ¾ inch	American	38,000	
0 ¾ inch	English	26,000	12,000
0 ½ inch	American	15,825	
0 ½ inch	English	8,500	7,325
0 7-16 inch	American	10,250	
0 7-16 inch	English	5,750	4,500

Professor Johnson's tests of tensile strength of bar irons, per square inch, make the following showing:

Salisbury, Conn., iron	58,000
Swedes iron	58,184
Lancaster, Penn, iron	58,661
Centre county, Penn., iron	59,400
English cable bolt iron	59,105
Essex county, N. Y., iron	59,962
Russia iron	76,069
Lake Superior iron	89,582

D. B. Martin, Engineer-in-Chief U. S. Navy, in his report to the Secretary U. S. Navy, says: "A piece was drawn down to half an inch in diameter, round, made into a chain link, tested in the cable proving machine, and broke at 169,120 lbs.

A writer in the London *Mining Journal*, discussing

COAL ECONOMY ON RAILROADS,

says: Two years ago the directors of the Lancashire and Yorkshire Railway placed at the disposal of the Institution of Mechanical Engineers one of their engines, for the purpose of testing an apparatus invented by Mr. G. Warsop, and as the result of those experiments, which have shown a saving in fuel of from 12½ to 15 per cent., the appliance is now being adopted on their line. Two engines have already been fitted up, a third, named the "Andus," is just completed, and is at present exhibiting at the Miles plating works of the company, and a brief description of the invention may be interesting. The Aero steam engine, that being the name given to the invention, is constructed in such a manner as to promote the more rapid and easy generation of steam by the introduction of heated air directly into the mass of water within the boiler. The method by which this is effected is as follows: An air pump fixed on either side of and worked by the engine forces a current of ordinary atmospheric air through a coil of heating pipes placed in the smoke box; the air thus flowing through the coil is, by the waste heat of the boiler, raised to a temperature of about 600° Fahr. A long perforated tube, extending the whole length of the bottom of the boiler admits this heated air into the water, the effect being, that not only is some portion of the water converted into steam by direct contact with the heated air, but the whole mass is instantly

stirred up and aerated. A small percentage of the heated air also joins the steam on its passage to the cylinder, and, by retarding condensation, adds to the energy of the steam, and consequently increases the working power of the engine. Thus, in addition to a saving of fuel to the extent already indicated, a considerable gain in work is effected, representing, according to tests, two additional wagons in a full train of 24. In addition to these advantages, the action of the heated air prevents a permanent settlement of incrustation on the boiler, fire box, or tubes, obviates priming, and diminishes the liability to explosion. The requisite pressure of air can be obtained almost instantly, and the working of the engine being connected with the working of the valves, or air pumps, secures its constant and continual injection into the boiler. The apparatus is applicable, not only to locomotives, but to stationary engines, and in these a very high percentage of gain in work done has been effected. Although the Lancashire and Yorkshire are at present the only company really adopting the apparatus, we understand that others have the matter in contemplation, any definite action having been suspended until the results of the experimental tests of the appliance should afford the means of judging of its actual utility.

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, March 9, 1874.

There is nothing encouraging in business to report from this city. Trade of every description is suffering extremely from the want of some definite action in Congress upon the currency question. Money is very abundant here and at other large business centers, always a bad sign for manufacturing enterprises, and both contractionists and inflationists would now gladly withdraw their propositions before Congress, if something certain as to the money of the future could be known. Labor is in a very unsettled state with most trades. Here the weavers, both cotton and woolen, are principally on strike for a return to the wages previous to the panic. The trouble appears to be that promises were made these people at the time of reduction that an increase would be allowed as soon as there was any business. The operatives claim that the mills are now making as many goods as before the panic, and disposing of them in some way, and hence they want the same pay as at that time. In the iron trade there is a good deal of trouble with labor. Puddlers are out at many of the mills in the interior of the State, and there is nothing in the condition of trade to justify mill owners in paying even present rates. A liberal minded employer told me the other day that it was no longer a question of wages with him. At present prices for material and product there was no possible or attainable reduction of wages which would give him a margin of profit on bars, and he should, unless a change occurred, soon shut down his mill until July. On the 5th inst. notices were posted in the Camden Iron Works, of Jesse W. Starr & Sons, that on and after Saturday, March 7th, the "big" and "new" pipe foundries of the works would be closed for the present. The men quit work immediately on seeing these notices, and having secured a hall, held a meeting and formed an association. Resolutions were passed declaring that they had not been treated as promised, and refusing to return to work in these shops unless at the rates paid before the panic. The organization is called the Workingmen's Union, of Camden, and has been also joined by the hands of the Cooper's Creek Foundry. The Starrs have always had the reputation of dealing very squarely with their men, and although a reduction was made at the time of the panic, it was done by mutual consent, rather than stop work. Early in January, when trade had improved as it did in December, the firm paid the old wages without any request, and, indeed, paid in gold and silver when currency could not be had. Nevertheless, from the action above noted, there is trouble now. Not long since the proprietors of Swift's Rolling Mills, at Newport, Ky., telegraphed the Governor of the State for protection to their mill, and to the Secretary of War to guard United States property in course of construction there. The locomotive engineers have openly declared their intention to strike in a body at an early day, and on several of the leading railroads strikes are in force among train hands. And here the oft quoted inquiry of Tweed comes in: "What *are* we going to do about it?" National legislation is next to impossible, if desirable. State legislation is quite as impracticable. The only sensible resort would seem to be to compromise, and the appointment of local Boards of Arbitration, supplemented by statutes imposing penalties upon interference with the conduct of any business. There must be a law which will bear on both parties, or it will affect neither. It is, however, a subject which newspaper preaching will not affect, and, like most others, has two sides to it, as is shown by the statement in the case of the weavers, where a skilled workman was not able to earn above $10 a week, and had to support a family on that.

Among the passengers of the steamer Vaderland, from this port lately, was W. B. Reany, marine engineer of the Chester Shipyard, who goes to Brussels direct, there to meet a special committee to establish rules for the classification of American built iron steamers. Mr. Reany takes samples of ship plates from leading American iron manufacturers, with drawings and specifications from our shipbuilders. This is a matter of considerable importance, both to builders and owners of American iron steamers, and the interest will be well represented by Mr. Reany. We are to have, probably, a State census of population and industry in 1875. This is highly desirable, and if other States would follow, would enable a census every five years for the whole country. Practically the decennial census is of no use, as we get none of the figures until too old to be of use.

A curious iron suit is being tried in the Supreme Court of your State which will attract some interest, and I note the points here. The plaintiffs are L. H. Weetzen and others, Dutch bondholders of the St. Paul and Pacific R. R., against that corporation and the Secretary of the Navy. The plaintiffs hold $1,500,000 of these bonds, subscribed for with the express stipulation that proceeds were to be used in building the extensions of that line and secured by all the property. Wm. G. Moorhead was the trustee under the mortgage, and also the contractor for building the road, thus securing the proceeds of the bonds as trustee and expending them as contractor. Moorhead was also a partner in the house of Jay Cooke & Co., and of Jay Cooke, McCulloch & Co., of London. A year after the sale of the $1,500,000 of bonds the money ran out, and about one-third of the iron had been laid on the road. A large number of old and new rails remained on hand, and were turned over to Jay Cooke & Co. as collateral for further advances. This firm turned them over to Jay Cooke, McCulloch & Co., of London, and the rails were in New York, Buffalo, Duluth and New Orleans. The bondholders claim that this iron was bought with their money, part of it used on portions of the road in which they had no interest, and that Jay Cooke, McCulloch & Co. had legal knowledge that it was the iron of the bondholders, as Moorhead was a partner in that firm. To complicate the case still further, at the time of the panic Jay Cooke, McCulloch & Co. had about $1,000,000 belonging to the Navy Department, and wanted to retain the account. To do this they secured the Secretary of the Navy by giving him a large number of securities, among which was 1600 tons of this iron, part in Buffalo, part in Duluth and part in New York. The iron in New York was kept as collateral for a loan of £100,000 which the London house had to have in November. This advance was obtained from the Secretary, and the papers representing the iron handed over to Mr. Cutter on the order of Secretary Robeson. Since the iron, old and new, has been in the possession of the government, part of it has been sold and the money received by the Secretary of the Navy; the portion of old rails, it is said, were sold as junk. Who owns this iron is now the question, and plaintiffs' lawyers claim that it can be recovered by them from the Secretary of the Navy, because, while the warehouse receipts were perfectly negotiable paper, and secure in the hands of an innocent party, the government cannot maintain claim to them, as its officers have no legal right to receive securities for loans. All of which will not probably increase Dutch confidence in American railroad bonds, or in the officers of the United States government.

We are promised a deliverance from the nuisance of smoke and cinders on railroad trains by an invention which attaches a pipe to the smoke stack of the locomotive, and conducts the smoke and cinders to a pipe in the roof of the first car, and thence, by similar pipes on all the cars, to the rear of the train, where it is discharged. The connections between the cars are of rubber, to prevent breakage by the oscillation of the train. Why this could not be more simply done by running the first pipe from the stack to the firebox of the locomotive, and there consuming both smoke and cinders, does not appear.

Annual Report of the Pennsylvania Railroad.

The annual meeting of the stockholders of the Pennsylvania Railroad was held in Philadelphia on the 10th inst. The meeting was an unusually important one, and the attendance extremely large. The Twenty-seventh Annual Report of the company was read by the secretary, Mr. Joseph Lesley, and presented the following as the condition of the company and its operations for 1873: The main line from Philadelphia to Pittsburgh, after meeting expenses, taxes and two semi-annual dividends, one of which was in scrip, shows a net surplus of profit of $2,198,767·14, an amount largely exceeding any deficiency from operating the leased lines. This revenue is itemized as follows: From passengers, mails, expresses, freight and miscellaneous sources, $24,886,008·99. The expenses for transportation, motive power, maintenance of track, rolling stock and general expenses, were, $15,440,305·16, leaving as net earnings, $9,445,703·74. In the item of maintenance of road is included the difference in cost of 16,760 tons of steel rails to replace those of iron, being $670,000. The increase of net earnings in 1873 over those of 1872 was $1,197,851·56, and the increase of gross earnings of $2,873,483·63.

The earnings of 511 miles of branch lines, leased and operated by the company were, in 1873, $2,557,527·22, with expenses of $2,560,097·10, showing a net loss of $17,430·12 in operating these lines. The sources of revenue for 1873, as compared with those of 1872, show some interesting facts. The increase from first-class passengers was $147,129·17. Emigrant passengers showed a decrease of $9,475·69. General freights an increase of $2,751,633·66; mails of $3,272·22; and miscellaneous matter a decrease of $19,820·38. In 1873 the company carried on the main line 5,879,684 passengers, an increase of 11·98 per cent. over 1872. The number of tons of freight moved, including 787,560 tons of fuel and other material for company's use, was 9,998,794 tons, of which 4,827,501 tons was of coal. The increase in freight over 1872 is about 18·19 per cent. The increase in the coal tonnage is over 20 per cent.

The expense of operating the road, including branch lines, in 1873 was 62·04 per cent. of the receipts, or, excluding the branch lines, 57·74 per cent. of receipts.

The earnings of the united railroads of New Jersey were, for 1873, $8,516,739·93, and the expenses, $6,792,188·05, leaving net earnings of $1,724,551·88. On these roads eight million passengers and over three million tons of freight were carried, while the cost of operating them was 74·4 per cent. of receipts. The net earnings of the New Jersey roads show a loss in operating the same in 1873 of $685,689·70. This loss is claimed to be due to great expense in handling freight and lack of facilities which are now being provided, and in the future it is expected these roads can be run at a profit.

These figures, although a rather brief condensation of the report, show that the main line and branches west are operated at an expense of about sixty-two per cent. of the receipts, and also that the traffic in both passengers and freight is steadily and rapidly increasing. Many of the leased lines are rather necessary connections than profitable feeders, and on the part of many stockholders the policy is questioned. As is natural in the management of any great corporation, there are two parties of stockholders representing the administration and the opposition, by the latter of which parties a good deal of acerbity of feeling was displayed at the meeting, and a set of resolutions offered strictly investigating the policy and management of the road.

As the election for directors is not held at the meeting, it is impossible to give the result as yet, but it is probable that some material changes will be made in the management which may materially alter the policy of the company in future, and affect railroad interests throughout the country to a certain extent.

Moving the Stove.

A few months ago the Danbury *News* gave some valuable advice as to the proper method of putting up a stove. It now furnishes some equally valuable suggestions with regard to the moving of stoves, from which we quote the following: A reader who is recently married writes us asking which end of a stove is the lightest. A stove is very deceiving, and one has to become well acquainted with a new one to find its points of advantage. Our friend should not be too hasty in taking hold of a stove. A stove that is to be moved should be visited in the still watches of the night before, and carefully examined by the light of a good lamp. The very end we thought the lightest may prove the heaviest (in fact, is extremely likely to), or it may be that the lightest end is the most difficult to get hold of and hang to. It is a very distressing undertaking to carry a half-ton of a stove by your finger nails, with a cold blooded man easily holding the other end, and a nervous woman, with a dust pan in one hand and a broom in the other bringing up the rear and getting the broom between your legs. In going up stairs it is best to be at the lower end of the stove.

Going backward up a stairway with a stove in your hands requires a delicacy of perception which very few people possess, and which can only come after years of conscientious practice. If you are below, you have the advantage of missing much that must be painful to a sensitive nature. The position you are in brings your face pretty close to the top of the stove—as no one can be expected to see what is going on when thus situated, you are relieved from all responsibility and thought in the matter, with nothing to do but to push valiantly ahead and think of heaven. Then above you is the carman, whom you do not see, with his lips two inches apart, his eyes protruding and his tongue lolling on his chin. And it is well you don't see him, for it is an awful sight. But the chief advantage of being below is that, in case of the stove falling, you will be caught beneath it, and instantly killed. Nothing short of your death will ever compensate for the scratched paint, soiled carpet and torn oil cloth. And no man in his senses—and with his hearing unimpaired—would want to survive the catastrophe.

Manufacture of Gold Leaf.

The process of gold-beating is exceedingly interesting in its various details, and is one which requires the exercise of much judgment, physical force, and mechanical skill. The coin is first reduced in thickness by being rolled through what is known as a "mill," a machine consisting of iron rollers operated by steam-power. It is then annealed by being subjected to intense heat, which softens the metal. It is next cut up and placed in jars containing nitro-muriatic acid, which dissolves the gold, and reduces it to a mass resembling Indian pudding, both in color and form. This solution is next placed in a jar with copperas, which separates the gold from the other components of the mass.

The next process is to properly alloy the now pure gold, after which it is placed in crucibles and melted, from which it is poured into iron molds called ingots, which measure ten inches in length by one inch in breadth and thickness. When cooled it is taken out in the shape of bars. These bars are then rolled into what are called "ribbon," usually measuring about eight yards in length, of the thickness of ordinary paper, and retaining their original width. These "ribbons" are then cut into pieces 1¼ inches square, and placed in what is called a "cutch," which consists of a pack of French paper leaves resembling parchment, each leaf 3 inches square, and the pack measuring from ¾ of an inch to 1 inch in thickness. They are then beaten for half an hour upon a granite block, with hammers weighing from twelve to fifteen pounds, after which they are taken out and placed in another pack of leaves called a "shoder." These leaves are four and a half inches square, and the gold in the "shoder" is beaten for four hours with hammers weighing about nine pounds. After being beaten in this manner, the gold leaves are taken out of the "shoders" and placed in what are called "molds." These "molds" consists of packs of leaves similar to the other packs, and made of the stomach of an ox. After being made ready in the "molds" the gold is beaten for four hours more with hammers weighing six or seven pounds each.

The thinner the leaf becomes, the lighter are the hammers used, and it is also necessary in beating the gold, especially in striking the "mold," that the blow should be given with the full flat of the hammer and directly in the center of the "mold." The leaf, after being taken out of the "mold," is cut into squares of three and three-eighths inches, and placed in "books" of common paper. Each "book" consists of twenty-five leaves, and there are twenty "books" in what is known as a "pack."

Plastic Carbon for Filters.—According to Prof. Kletzinsky, two mixtures have been found best adapted to this purpose in practice—the one consisting of 60 parts of coke, 20 of animal carbon, 10 of charcoal and 10 of pipe clay; the other of 10 parts of coke, 30 of animal carbon, 20 of charcoal and 40 of short fibred asbestos. The ingredients, except the asbestos, are finely powdered, passed through a sieve, and intimately mixed while dry, and then mixed with as much molasses or syrup as may be necessary to form a plastic mass, about as much as the weight of the dry powder. This dough is well worked, and then formed into cylinders or discs, allowed to dry for some time at a moderate temperature, and then burned in a carefully heated muffle, without access of air. After being slowly cooled, the soluble salts are extracted, and the sulphide of iron decomposed, by placing the article in very dilute hydrochloric acid. The filter is then thoroughly washed in running water, dried, and again heated to dull redness, in a well closed muffle, and finally shaped, by turning, as may be desired, for beakers, funnels, etc. Closed hollow vessels can be formed by luting together two suitably shaped vessels of the substance by means of a certain paste. This is prepared by covering the turnings from the washed masses, thinly, with pure syrup (made by dissolving refined sugar in half its weight of water), and triturating them. The edges of the vessels to be luted are first well fitted together, and then coated with the paste, so as also to fill all the seams; and the whole, after drying thoroughly, is to be burned at a dull red heat. While the fused sugar carbon affords a vitreous mass, the asbestos and coke and coal give firmness and form the framework. The charcoal removes especially fusel oil and odorous gases, and the nitrogenous animal carbon extractive and coloring matter. Tubes of different materials can be firmly cemented to the filters by plastic sulphur or good cement, such as is made with chalk, clay and water glass.

An Improved Gas Furnace for Heating and Melting Metals.—Perrot's improved furnace, though of small size, is capable of melting alloys of average fusibility in considerable quantities at a very small cost. The heating apparatus proper consists of six burners of bronze, fixed on a box to which is led the air and gas which are to be mixed. This box is divided horizontally into two compartments; the lowest of these chambers is annular, and receives the gas which passes into the burner through little conical nozzles, whilst the air enters the upper compartment direct, and thence to the burners. The gas is regulated by means of a tap on the supply pipe, on which is mounted a small gauge. The air passes into the box, through a valve formed of a disc pierced with three openings corresponding to three holes of the same diameter formed in the bottom of the box. A lever connected with the valve serves as a regulator for the supply of air. The burners are bent round at the ends, in order to give a curved direction to the flame, and to mingle the gas more intimately with the air coming from the outside of the burners. The flame heats a crucible carried upon a cylinder of fire-clay, and a small cast iron chamber is placed beneath to receive the melted metal in case of an accident happening to the crucible. After the crucible has been heated, the gases circulate around the outside of an envelope surrounding it, and then pass into an ordinary chimney, or through a stove-pipe. Such a furnace may be built at small expense, and will be found a valuable addition to almost any workshop or laboratory.

Iron Exports.—American car wheels have now become a permanent and reliable item in our domestic export trade. In the year 1871 the number exported was 2317; in 1872 it was 4760, and in 1873 it rose to 7515 despite the stagnation of the last four months. This is of much more importance to American industrial interests than the question whether our raw iron can be profitably exported to England. As regards the latter, the exports of pig iron for the fiscal year ending June 30, 1873, were $140,683 against only $69,331 for the previous year, and of bar iron, $33,767 against $4532 for the preceding year. But these are small matters compared with the exports of our manufactured articles, such as machinery, $3,120,984; locomotives, $952,655; nails and spikes, $356,990; steam boilers, $232,546; castings, $159,234; rails, $104,054; stoves, $115,792; stationary engines, $111,507; general iron manufactures, $3,262,170; edge tools, $846,452; fire arms, $1,181,869; general manufactures of steel, $297,541. This is what the report of the American Iron and Steel Association referred to when speaking of the surplus iron for export. The exportation of raw products is of far less profit to a country than the shipment of the manufactures in which these products are used. Hence it is desired that the estimated surplus of one million tons of iron above domestic needs, supposing all the mills to be worked to their full capacity, should be exported in the shapes noted rather than to find shipment in their raw forms. As regards the tariff duties, the necessities for revenue must keep them up to a protective standard.—*North American.*

Kentucky Iron Ore.

A correspondent of the Louisville *Commercial* writes as follows:

The development of the iron ore in this vicinity, with increased assurance both as to quantity and quality, invites the attention of the capitalists and ironmongers of Louisville, that the product may be used in her vicinity as the most convenient depot for shipment South. The attention of the farmers has, to some extent, been drawn to this item of the wealth of the soil, and they find that it appears, upon continued examination, to be apparently inexhaustible, and of richer quality than before supposed. The result of some mining and exploration show that the per cent. of iron increases beyond the surface rock.

Some specimens of detached pieces from new localities show a larger per cent. of metal than any heretofore analyzed. The admixture of manganese also continues, affording an assurance of the valuable character of the ore for Bessemer steel, or the compound found in Rhenish Prussia. The success of the development seems assured, and the Indianapolis capitalists and iron men are preparing to take hold of the work.

Great credit is due to Professor Cox, the State geologist, in bringing this ore into notice, and organizing means for the successful working of the ore. He has amply refuted the false report of the poor quality of this ore sent forward by a newspaper from Clay county, and has caused the mineral sent forward to be taken to another furnace. While the people of the neighborhood are under great obligations to Professor Cox for defending them, it seems proper that this ore be worked at the "Falls" as its proper mart. The quantity, however, according to present developments, promises to be sufficient for a furnace at Indianapolis and one at Jeffersonville or Louisville, with such admixture with other ores as seems most beneficial in smelting.

This ore can be found in Scott county, near the new county seat, Scottsburg, and probably can be found in most of the knobs between this and Scottsburg. The only question now for the people remains is how to bring it into use to the best advantage.

Indianapolis is about to have a company organized for the purpose of smelting iron ores, expecting to obtain a portion of the supply from the ores of this and adjoining counties. The facility to bring the ore to the railway at this depot, and this appearing to be near the center in the line of the ore beds, seems to render this the principal point for shipping the ore.

Zinc Works at Cherokee, Kansas.

The Neosho *Times* says of the new zinc works at Cherokee:

The works are built and owned by the Chicago Zinc and Mining Company, of Chicago, and are situated on 160 acres of superior coal lands owned by the company, and within easy reach of Fort Scott and Gulf road on the west, and at the terminus of the Memphis, Carthage and Northwestern road on the east. All of the four large smelting furnaces are now being constantly fired, preparatory to the first charging of ore, and the two large roasting furnaces have been constantly running, preparing the crude ore, for nearly a month past. Beside these six furnaces, the works comprise an extensive pottery for the manufacture of fire-brick and fire clay retorts, crushing and screening apparatus of the most approved patterns and largest capacity. The works, as now completed, will smelt from one or two car loads of ore per day, and are preparing to use either blende or silicate ores in their different furnaces. The cost of the construction of the work is, in round figures, $45,000, and the mining lands and leases held by the company $20,000 more. We understand that the intention now is to double the furnace capacity in the spring by the erection of four more smelters and six more roasters. Our miners have already experienced very considerable benefits from the impulse given to the working of black jack deposits which, at prices now offering, yield a good, living profit, and more than meet the expenses of prospecting at the same time for lead. It is proposed to make these new furnaces the center of the largest manufacturing interest in the Southwest, and we recommend the attention of miners and parties interested in zinc ore or lead lands to the liberal contracts offered by this company, and the facilities they possess for handling all descriptions of ore.

Projected Elevated Railroad to Westchester County.—There is now before the Legislature a bill which provides for the construction of the New York and Westchester Iron Viaduct Railway, a line which is proposed to extend from Park Row to the city limits in Westchester county. It is reported that the project is a bona fide one, and that if the bill passes the Legislature, work will be commenced soon afterward. Capitalists are said to be ready to take the stock, and contractors will be found who will construct the road for $400,000 per mile. The bill provides for a double track suspension line, which will be suspended on cables from post to post, the pillars being distant about a 100 feet from each other. It is proposed to stop once in every half mile, and to make the journey from Harlem Bridge to the City Hall in nineteen minutes. The fare will be six cents to Harlem Bridge, and eight cents beyond that point. If the bill passes the Legislature the projectors say the road would be completed in eighteen months. They expect to be opposed by the Third Avenue Company, and also by the Fourth Avenue Company, and parties interested in other property.

The Outlook for the Coal Trade.

We take the following from the Pottsville *Miners' Journal:* We know of no period in the history of the coal trade when it was so difficult to make any predictions as to the consumption of coal, as it is now. At the beginning of the year there were evident indications of an improvement in the iron trade, which is the great consumer of coal, but at this time there seems to be but little improvement, and at the recent meeting of the iron trade held in Philadelphia, the reports made from all parts of the country exhibited it in a much more depressed condition than it was generally supposed to be. The product of both pigs and bar iron in 1873 has fallen off to a considerable extent from the product of 1872, and of the 735 furnaces of all kinds for producing pig iron in this country, about one-fourth are idle; and of the 304 rolling mills of all kinds, about one-third were also idle. The product of nails in 1873 is estimated at 40,000 tons less than in 1872, and was 312,000 tons less than in 1871. This exhibit of the iron trade is certainly not very flattering, and much will depend on the legislation of Congress whether it will revive sufficiently during the year to require much increase in fuel. If Congress were to restore the reduction of 10 per cent. made in the scale of duties in 1872 on iron, cotton goods, etc., which was totally uncalled for, it would soon set all the iron works in motion again, which would react on all other branches of home industry in a similar condition, and the market would take an increase of not less than one and a half millions of tons of anthracite coal; but if a revival in the iron business does not take place in the spring, the increased quantity required in 1874 will fall short of a million of tons, and may not exceed a half million.

The importation of iron from abroad has been greatly checked by the increased prices of coal and labor in England, which has given the advantage in our home market to our home producers. The English manufacturers are aware of this, and in order to compete with our iron manufacturers they have organized to reduce the rates of wages and also the price of coal, both of which are already falling in price in England. They expect in a few months to enter our market again with prices so reduced that they will again flood our country with their products in competition with our own manufacturers, who must also force a reduction in wages to meet this competition, or leave their furnaces and mills stand partially idle. The restoration of the 10 per cent. duty would keep out these foreign products to a great extent, and if we could furnish our own market with the iron we require and can produce, all the iron works in the United States would soon be set in motion again, and they would be secure from any damaging competition from abroad. But few persons are aware of the immense quantity and value of iron imported, and, therefore, we furnish below the value of iron and iron manufactures imported into the country in the following years, taken from the official records at Washington:

In the fiscal year 1867-68 the imports of iron and steel were	$23,378,710
In the fiscal years 1868-69 the imports of iron and steel were	29,446,336
In the fiscal year 1869-70 the imports of iron and steel were	32,665,454
In the fiscal year 1870-71 the imports of iron and steel were	44,425,975
In the fiscal year 1871-72 the imports of iron and steel were	55,540,088
In the fiscal year 1872-73 the imports of iron and steel were	60,438,515

Here are upward of sixty millions in value of iron and iron manufactures imported into this country in a single year, and if we could only manufacture one-half of this quantity at home, in addition to our present home productions, it would set every iron factory at work in the country; and all other factories now idle in other branches of business would start also and give employment to the thousands of workingmen out of employment, and who are clamoring for work. The statement above shows the immense increase in importations since Congress reduced the duty on iron in 1870. With such facts and figures the question very naturally presents itself, is Congress legislating in the interest of home industry, or are their actions controlled by foreign interests, to the detriment of home interests?

Under these circumstances the increased supply of coal required for 1874 will depend entirely on the early revival of the manufacturing industries of the country, and particularly that of the iron trade.

Since the above was written, the spring rates for coal have been promulgated by the different companies. The Philadelphia and Reading Coal and Iron Company have promulgated their opening rates for the month of March, 1874, for coal put on board of vessels, which are as follows:

	Lp.	St.	Br.	Egg.	St.	Ch.
Hard White Ash	$4·05	$4·15	$4·25	$4·40	$4·85	$3·50
Free Burning do	4·05	4·15	4·25	4·40	4·85	3·50
Schuylkill Red Ash	..	..	4·40	4·50	4·85	3·75
Shamokin W. A.	..	..	4·25	4·40	4·85	3·50
Alaska Red Ash	..	..	4·25	4·40	4·85	3·75
Shamokin	..	..	4·50	4·85	4·85	4·00
North Franklin	..	..	4·85	4·85	4·85	3·75
Lorberry	..	..	4·50	4·70	4·85	4·00
Lykens Valley	..	..	..	5·50	5·50	4·25

These prices average about 21 cents per ton advance over the average prices for April, 1873, on white ash coal:

The rates for April, 1873, were as follows at Philadelphia:

	Lp.	St.	Br.	Egg.	St.	Ch.
Hard White Ash	$4·00	$4·00	$4·00	$4·15	$4·30	$3·50
Free Burning do	4·00	4·00	4·00	4·15	4·30	3·50
S. Red Ash	..	..	4·25	4·40	4·60	3·75
Alaska Red Ash	..	..	4·00	4·15	4·40	3·50
Shamokin W. A.	..	..	4·00	4·15	4·30	3·50
Shamokin Red Ash	..	..	4·25	4·40	4·60	3·75
North Franklin	..	..	4·50	4·75	4·85	3·75
Lorberry	..	..	4·25	4·50	4·50	4·00
Lykens Valley	..	..	..	5·50	5·50	4·25

The opening rates at New York ranged from 50 to 60 cents per ton higher, according to the quality of coal, and drawbacks are allowed by the Philadelphia & Reading Railroad on coal going to the East, to make the difference in freights, &c., from Philadelphia to New York and the Eastern markets.

The opening rates for March, 1874, at New York, are as follows, on board vessels at the different shipping ports:

	Lp.	St.	Br.	Egg.	St.	Ch.
Lack., Del & Hudson Co.	$4·55	$4·65	$4·75	$4·90	$5·25	$4·35
Scranton	4·55	4·65	4·75	4·90	5·25	4·35
Wilkesbarre	4·55	4·65	4·75	4·90	5·25	4·35
Lehigh Coal Exchange	5·35	..	5·30	5·30	5·45	4·35
Honey Brook	5·35	..	5·30	5·30	5·45	4·35
Lehigh Old Co	5·50	..	5·45	5·45	5·60	4·65
Room Run	5·00	..	5·00	5·00	5·35	4·35
Plymouth	..	..	4·75	4·90	5·35	4·35

These are all the circular prices we have received for the month of March, 1874. The following are the only rates for March, 1873, we have at hand for comparison.

Wilkesbarre Coal and Iron Company's prices for March, 1873, on board vessels at New York:

Lump	$4·45	Egg	$4·80
Steamer	4·55	Stove	5·00
Broken	4·65	Chestnut	4·45

The following were the April prices for the following coal, on board vessels in 1873, at New York:

	Lp.	St.	Br.	Egg.	St.	Ch.
Lehigh Coal Ex.	$5·25	$5·20	$5·20	$5·20	$5·25	$4·60
Lehigh Old Co.	5·50	..	5·30	5·30	5·35	4·60
Plymouth	..	..	4·75	5·05	5·25	4·65

These quotations will be sufficient to show the advance in the opening prices for March, 1874, which vary on different sizes, but will about average, on the whole line, from 12 to 15 cents per ton.

Special Notices.

To Manufacturers and Dealers in Iron and Steel.

The subscribers are engaged in the manufacture of a specialty, the demand for which has outgrown their capacity to supply. The business may be increased to millions of dollars annually, paying a net profit of 30 per cent. Parties desirous of extending their business in a direction that will augment their profits—without risk—may obtain full particulars, by addressing,

MORSE & BENNET, 57 Cedar St., N. Y.

A man with over 20 years' experience in the manufacture of Iron, a thorough, practical draughtsman, Civil and Mechanical Engineer, at present in charge of the construction of a blast furnace in the South, will be open to engagement shortly.

Address, *IRON MASTER,*
Office of The Iron Age,
No. 10 Warren Street, N. Y.

Situation Wanted.

A Hardware Salesman, well acquainted with the trade, is desirous of making an engagement as traveler, for the New England Trade. Address Z. Y. X. Office of *The Iron Age*, 10 Warren st., N. Y.

LE MONITEUR DES INTERETS MATERIELS.

Paris, - - Brussels.

Weekly Industrial paper. Agent for advertisements for the United States. **C. KIRCHHOFF,**
Commercial Editor "El Cronista,"
Box 2806 P. O., N. Y.

J. M. WHITE,

Architect and Constructor of Charcoal Blast Furnaces. Plans, Specifications and Estimates of construction furnished upon application.

Office address,
FON DU LAC, WIS.

$7000

Will buy the stock, fixtures and good will of a well established Hardware, House Furnishing, Stove and Tin business. Sales of 1873, $32,000. A very desirable chance to invest and to step into business.

Address, *OTTO MEYER,*
452 P. O. Box, Little Rock, Ark.

High Grades BOILER PLATE IRON, Locomotive Tank Iron, FIRE BOX IRON,

And plates of every character and variety, and of all the higher grades of Iron, from one-half inch thick to No. 18 W. G., rolled to specification.

Also, High Grades Bar Iron

Of refined and double refined qualities, and of all sizes, rolled to order.

Having a productive capacity of 20,000 tons per annum, we are prepared to fill large specifications promptly, while our Irons, being neutral in character and uniform in their working qualities, need but a trial to ensure their continued use.

Rolled Railroad Axles a specialty.
Consumers' Direct Trade solicited.

Catasauqua Manufacturing Co.,
Catasauqua, Pa.

REPRESENTED BY

Theo. Sturges, 240 Pearl St., N. Y. **Geo. B. Atlee,** 333 Walnut St. Phila.

Wanted.

A young or middle aged active and energetic partner, with twenty to forty thousand dollars capital, in an old established and well paying wholesale business in a healthy Western city. Best of references given and required. Address, **B.,**
Office of The Iron Age,
10 Warren Street, N. Y.

ROLLING MILL.

We have the machinery for a bar mill, which we wish to put in operation at Lockville, Chatham county, North Carolina. Lockville is on the Raleigh and Augusta Air Line Railroad and the Deep River, ten miles below the Egypt Bituminous Coal Fields. The climate is mild and the location desirable. A mill at that place would command all the local trade of the State. A person or persons having a knowledge of the business, and capital sufficient to work it, wanted to take an interest. Inquire of

J. M. HECK, Prest.
Deep River Mfg. Co., Raleigh, N. C.
Or **GEO. G. LOBDELL,**
Wilmington, Del.

DAYTON & LAMBERSON'S

(Copyrighted Standard Lists.)

DISCOUNT BOLT LIST.

Book form, Common and Philadelphia Lists, 20 discounts.

DISCOUNT SCREW LIST.

Iron Screws, 13 discounts.

PRICE REDUCED.

Bolt List, 60c.; Screw List, 50c. per copy. Address,
DAYTON & LAMBERSON, 83 Duane Street, N. Y.

Rolling Mill.

$30,000 to $50,000 Capital Wanted in a Rolling Mill, capacity 25 tons per day. Well located, within 40 miles of New York by water and railroad communication. Apply to or address,

HENRY G. NICHOLS,
14 Platt St., N. Y.

Special Notices.

Wanted—Partner,

By an active and experienced furnace man, in the purchase of a charcoal furnace in one of the healthiest regions of Tenn., with about 9000 to 10,000 acres of land, about 6000 first forest growth, about 1000 cleared and improved, the residue in second growth, from 5 to 25 years old. Newly repaired Blast furnace with Hot Blast and all modern improvements, saw and grist mill, store house and office, and sixty good dwellings. Inexhaustible supply of rich brown hematite ore in close proximity to furnace; rail and river shipping facilities. Iron can be manufactured at $18 per ton, and put into market at Louisville or Cincinnati, at $3 to $3·50. For further particulars, address, *A. DUBOIS,*
Clarksville, Tenn.

STERLING IRON & RAILWAY CO.

MAKERS OF

STERLING ANTHRACITE PIG IRON

FOR FORGE AND FOUNDRY USE.

A. W. HUMPHREYS, Treas.,
42, PINE ST., N. Y.

Co-Partnership Notice.

PHILADELPHIA, January 1, 1874.

W. R. Gurnis is this day admitted as a partner in our firm. The style of the firm remains as heretofore. **MALIN BROTHERS,**
Iron Commission Merchants,
No. 228 Dock Street.

To the Trade.

HARDWARE TRADE REGISTER.

1874

Owing to the backward state of trade occasioned by the late panic, we have deemed it advisable to defer the issue of our Trade Register until a later period than usual in order to give its benefits to the trade of next season.

It having come to our knowledge that certain parties, evidently having no reputation of their own, are endeavoring to trade upon our already established reputation, by assimilating our title, and even, in some instances, from what we understand, using our last edition for canvassing purposes, we respectfully anounce to the trade that we are now canvassing for our next edition, which will contain additional features of interest calculated to make it still more valuable than it already is, and render it indispensable as a work of reference to the trade, **and we ask them to withold their advertising favors until our agent may call upon them.**

Please Notice that we always have a printed form, bearing our address 4 & 6 Warren St., for orders for advertisements, and that they are payable only to the order of the Manager.

The Merchants and Manufacturers Agency,
(MERCANTILE.)
No. 4 & 6 Warren St., N. Y., Publisher.

CAUTION

No advance payments required for regular advertisements; but **all small matter is payable in advance.** And our only authorized agents to collect money are invariably provided with a certificate of authority, bearing our official seal, and signed by the manager, and are instructed always to give our printed receipt stamped with our seal and countersigned by the party receiving the money.

S W THOMPSON, Manager.

TO INVENTORS.

Patents secured in the United States and Europe, on the lowest terms and very

PROMPTLY,

by **A. V. BRIESEN,** Solicitor of Patents and Attorney at Law in Patent Cases.
258 Broadway, N. Y., cor. Warren St. Consultation gratis.

THE CANADIAN BANK OF COMMERCE.

Capital - - $6,000,000, Gold.
Surplus - $1,500,000, Gold.

The New York Agency, No. 50 Wall Street, buys and sells Sterling Exchange, makes Cable Transfers, grants Commercial Credits, and transacts other Banking Business.

J. G. HARPER,
J. H. GOADBY, Agents.

R. T. HAZELL, AUCTIONEER.

By R. T. Hazell & Co.,

Store No. 94 Reade Street.

Our REGULAR SALES of HARDWARE, CUTLERY, FANCY GOODS, &c., will be held on TUESDAYS and FRIDAYS throughout the season.

CASH ADVANCES made on CONSIGNMENTS without additional charge.

"ENGINEERING,"

Weekly Illustrated Journal, edited by **W. H. MAW and JAMES DREDGE.**

OFFICES, **37 Bedford St., Strand, London, W. C.**
52 Broadway, New York.

GEO. ED. HARDING, C. E.

Representative in United States.

This most successful English Engineering Journal, containing thirty-six pages, weekly, illustrating the latest advances in Civil, Mechanical, Mining and Military Engineering Science, both in Europe and America, can now be obtained by American subscribers, post paid, for $9·50, currency, per year, sent to the New York office of the Journal.

All the important details of the buildings and novel machinery at the great Vienna Exposition will be illustrated and described in *Engineering* the current year: and this, with illustrations of all the larger American engineering structures, will render it invaluable to every American Engineer, Architect, Iron Master and Machinist.

The best medium for advertising American Machinery to the attention of European capitalists.

Send for specimen copy, free.

"Engineering" and "The Iron Age" for one year, $12.00.

NEW YORK, July 1, 1873.

Special Notices.

MANUFACTURERS

desirous of introducing their goods to the **British** and **Continental Markets**, are advised to insert advertisements in the newspaper **"IRON,"** published every Saturday, at **99 Cannon Street,** *London, E. C.*

SCALE: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

CHARCOAL IRON.

Parties owning a large and very superior Furnace, 6 miles from Cincinnati, and an unlimited supply of the best Iron Ore, adjoining it, with abundance of timber for making Charcoal, wish to enter into arrangements with men of experience and means to run the Furnace for a term of years, under arrangements to be agreed upon. There is no place in the United States where Charcoal Iron can be made at as low a cost, or where transportation to market will cost less. Apply to

JOHN A. POMEROY,
No. 47 West Second St., Cincinnati, O.

For Sale.

Valuable Iron Mill FOR SALE,

AT

ROME, GEORGIA.

Pursuant to a decree in Chancery, in Floyd Superior Court, the undersigned have been appointed Commissioners to receive sealed proposals until the 1st day of May next, for that valuable property in the city of Rome, in said State and county, known as the **ROME IRON WORKS**, more particularly described as follows:

The property of the Rome Iron Manufacturing Company consists of the Rolling Mill Building 200 x 140 feet, well finished and substantially built, with heavy truss roof. A train of 18 inch Puddle and Bar Rolls, and 9 inch Guide Mill. Two Horizontal Engines of 120 Horse-power each, to drive Rolls; two [2] heavy Steam Shears; Rolls and Saw for making light T Rail; twenty Nail Machines and one Spike Machine—also one Railroad Spike Machine—all with counter shafting and belting complete to run the same. One Beam Engine of 120 Horse-power to run Nail and Spike Machines; one 72 inch Demphill Fan-Rock and Ore Crusher; Furnace for heating Nail Plate and six large Grind and Bead Stones substantially set on Iron Frames; three Heating Furnaces; three Puddling Furnaces [two double and one single]; one 30 ton Track Scale, with side track in the mill; twelve Cylinder Boilers, 30 feet long, and a Battery of 2 flue Boilers, 42 inches diameter, 30 feet long; two 16 inch flues supply the steam power. The Cylinder Boilers being placed over the Heating and Puddling Furnaces use the waste heat from the furnaces for generating steam. Also one Pumping Engine and Wrought Iron Tank for supplying the mill with water.

The whole mill is most complete in its arrangements for receiving and manufacturing and shipping materials, being probably one of the best arranged mills in the States. The Mill is in excellent order, and in full operation; possesses unlimited facilities for getting Coal and Pig and Scrap Iron cheaply, and has a cash market for its entire products. It has a

Capacity of 125 Kegs of Nails per day.
" " 3 Tons of Spikes per day.
" " 12 Tons Bar Iron per day.

Pig Iron can be purchased for $30·00 per ton; Wrought Scrap from $25·00 to $35·00. A force of Skilled Workmen—old hands—are operating the Mill.

We solicit bids for this property and invite capitalists to come and make personal inspection of the same. All correspondence will be carefully and fully answered. We refer by permission to Noble Brothers & Co., whose Foundry and Machine Works are contiguous to the property described.

CHAS H. SMITH,
T. W. ALEXANDER,
C. ROWELL, Commissioners.

FOR SALE.

Valuable **IRON FURNACE,** about quarter of a mile from a station on the Pennsylvania Railroad, in Huntingdon county. This furnace is in complete running order, has Steam and Water Blast Fixtures, with new Hot Blast and can be run with either charcoal or coke. Attached to the furnace are 175 acres of land, all in cultivation, on which there is a two story office and 14 dwellings. 4000 acres of timber and good Iron Ore Land in the immediate vicinity of this furnace can be purchased, if desired. For particulars and terms, apply to

NISBET & HEISLER,
808 Walnut St., Phila.
Or **J. M. GREEN,**
Milesburg, Centre Co., Pa.

FOR SALE,

Or to lease on liberal terms to Manufacturers, building sites and water fronts on the property of Steinway & Sons, comprising 400 acres of land, with 4000 feet of water front on the East River, situate in Astoria, opposite 120th street, New York, and presenting unsurpassed facilities to the Iron Trade. The Saw Mill, Iron Foundry and Machine Shops of Steinway & Sons have been erected on the ground, and are in full operation, and their entire Piano Manufactory will be removed to the premises.

For further particular address or call on

STEINWAY & SONS,
Steinway Hall, N. Y.

To Iron Manufacturers. For Sale,

One of the best located sites for a large **IRON FOUNDRY AND MACHINE SHOP,** is now offered For Sale on favorable terms. The advantages are, both water communication and railroad on and through the premises. Location at Trenton, N. J. Lot, from one to seven acres in size to suit purchaser. Apply to

SAMUEL L. BAILEY & SON,
45 East State Street, TRENTON, N. J.

For Sale, &c.

FOUNDRY PROPERTY

For Sale, or to lease with privilege to buy consisting of Foundry, Machine Shop, with powerful steam engines, and other buildings. Water front on North River, Peekskill, 42 miles from New York, comprising 2¼ acres. Apply for particulars, to

C. E. APPLEBY, 167 Broadway.

STEAM ENGINE, ROLLING MILL TRAINS, &c., FOR SALE.

1 Large Steam Engine 24 in. Cylinder, 5 ft. Stroke, Green's Pattern, Sickles Cut off, good running order. Price $2,500. Run, say, 3 years.

1 Andrews' Oscillating Steam Engine, 6 in. Cylinder, 12 in. Stroke, nearly new.

1 Train 18 in. Puddle Bar Rolls.

1 Train 16 in. Finishing Bar Rolls, with a fair assortment of Rolls for Round, Square and Flat Iron, price 2½c per lb.

1 Train 9 in. (Guide Mill) Rolls for making ¼ to ⅞ in round and square Iron. Price 2½c. per lb.

7—30 in. dia. by 30 ft. Boilers with Columns, and Castings for setting same over puddling or heating furnaces, 2½c. per lb.

9 Sets furnace Castings, 2½c. per lb.

50 ft. 6 in. wrt. Shafting with Journals and pedestal, 5 cts. per lb.

2 Sets Shears for cutting Bar Iron.

1 Roll Lathe.

1 Large Nut punching Machine, nearly new, $450.

4 Washer do. $90 each.

1 Circular Saw and frame for cutting ends of Bars and Rails.

Inquire of **JOHN W. QUINCY,**
98 William St. New York,
or J. W. LEONARD, Somerset, Mass.

SAFE INVESTMENT. For Sale, Big Muddy Coal, Timber & Farm Lands.

The whole or one interest in 746⅔ Acres of the Big Muddy Smelting Coal Lands, in Jackson County, Illinois. Vein 3 and 6 feet in 80 feet from surface; five improved Farms, with 246 acres under fences; Timber, such as White and Burr Oak, Walnut, Poplar, Ash; being 500 acres. The Timber alone will pay for the land. The St. Louis and Cairo Railroad runs through said lands, two miles from Murphysboro, the county seat of Jackson County, Ill. Will sell the whole for $75 per acre, and take half or one-third interest. Address

DOBSCHUTZ & ABEND,
Owners of three Mines in St. Clair Co., Illinois,
Belleville, St. Clair Co., Ills.

FOR SALE.

A first-class Hardware Store and Tin Store, located in one of the best towns in Ohio, doing a business of about $65,000 per year. Stock will invoice about $18,000. Satisfactory reasons given for selling.

Address, **N. & B.,**
Care **Office of The Iron Age,**
10 Warren St., N. Y.

Hardware and Paints.

For Sale, an old established Hardware Store, doing a safe and profitable business in a growing manufacturing town. Stock about $12,000, in good order and well assorted. Address,

W. R. BIXBY & SON,
Vergennes, Vt.

HARDWARE STORE.

For Sale, a first class Tool and Hardware business, situated in the best business part of Jersey City. Established about 25 years, and in flourishing condition. Apply to **H. LUTTGEN,**
57 Montgomery St., Jersey City.

SECOND-HAND MACHINERY For Sale.

We have now on hand and will sell at very moderate rates, the following lot of second-hand machinery, viz.:

Five Double Hoisting Engines, suitable for mining, tunneling or other purposes. Each of these engines has two cylinders, 7½ in. diam. by 18 in. stroke; two drums, 4 ft. diam. by 4 ft. long; geared to engine in proportion of 8 to 1, and are provided with disconnecting gear and friction brakes.

One 8 Horse-Power Portable Lane & Bodley Engine. Cylinder, 6 in. by 12 in., nearly new.

One 25 Horse-Power Portable Engine, in first rate condition. Cylinder, 10 in. diam. by 24 in. stroke.

One 30 Horse-Power Portable Engine, with Circular Saw Mill and Saw complete.

One 12 Horse-Power Stationary Engine. Cylinder, 8 in. by 12 in.

Five 4 Horse-Power Stationary Engines. Cylinder, 4 in. by 10 in.

One 30 Horse-Power Locomotive Boiler, in first-rate condition, nearly new.

One 25 Horse-Power Locomotive Boiler, in first-rate condition, nearly new.

One 30 Horse-Power Vertical Boiler.

One 20 Horse-Power Vertical Boiler.

Two Flue Boilers, 26 ft. long, 42 in. diam., each w two 14 in. flues, in good order.

Four No. 6 Sturtevant Blowers.

One No. 2 Sturtevant Blower.

Two No. 4 McKenzie Blowers.

One No. 6 Andrew's Centrifugal Pump.

One No. 6 Turbinate Centrifugal Pump.

Seven No. 0 Cameron Pumps.

One Knowle's Pump.

One Earle Pump.

Three Woodward Pumps.

For further particulars, address,

WM. E. TANNER & CO., Richmond, Va.

Valuable Iron Works, For Sale.

The undersigned offers for sale the Iron Works in Pottsville, Schuylkill County, Pa., known as "The Washington Works," consisting of a

Large Stone Machine Shop & Foundry,

Brick Pattern House, Erecting Shop, Stone Blacksmith Shop, Brick Office, and Lot of Ground containing in front 195 feet 3 inches, and in depth 260 feet.

There will be sold with the above a large and valuable collection of Patterns, Heavy Crane Flasks and Heavy Core Spindles for making heavy Castings and Pipes of all sizes; Turning and Planing Tools. The Works can be put in immediate operation. A favorable opportunity is here presented for enterprising men. The demand for Castings and Machinery is constantly increasing in this region. The property will be sold on liberal terms. *If not sold in a reasonable time it will be for Rent.*

For particulars apply to

J. W. ROSEBERRY, Trustee,
Pottsville, Pa.

FOR SALE. Hardware, Stoves & Tinware & Business House,

Doing a **Cash Business of $20,000 per annum at 25 per cent. profit, in Central, Ills.** For information address **"W."**
Office of The Iron Age, 10 Warren St., N. Y.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, March 11, 1874.

The past week has been one of extreme dullness in the financial markets, owing to causes fully set forth in previous reports. Congress still postpones any action on the currency question, and seems to be but little nearer a decision as to what it is best to do than it was a month ago. Owing to the very limited demand for money, call loans have been easily obtained at 3 @ 5 per cent., and prime mercantile paper is fairly quotable at 5 @ 6½ per cent.

The gold market has been dull, with a downward tendency, shown in the fluctuations of the premium, which has ranged as follows:

	Highest.	Lowest.
Thursday	112⅛	111⅞
Friday	111⅞	111¾
Saturday	111⅞	111¾
Monday	111⅞	111¾
Tuesday	111⅞	111⅝
Wednesday	112	111⅝

The stock market has been irregular and dull, with principal dealings in Lake Shore, Western Union, Northwestern, Wabash, Union Pacific, St. Paul and N. Y. Central. The highest and lowest of to-day's prices on 'Change are given below.

Government bonds have moved in sympathy with gold. Railroad mortgages, and investment securities in general, have been dull and barely steady. We give below the closing prices of governments.

A call has been issued, signed by a large number of well known citizens, for a mass meeting, to be held in this city, to protest against further delay on the part of Congress in taking definite action on the currency question. We hope other cities will follow this example. Some time ago it was proposed—as announced in this journal—to hold a series of mass meetings in Philadelphia and other cities, to give expression to the popular sentiment in favor of free banking; but for some reason the plan was dropped and no meetings were held. It is not too late, however, and we hope the business men and manufacturers throughout the country will adopt some means of making their protest against Congressional inaction heard in Washington. Until it is known what Congress will do, we can hope for no general revival of industrial and commercial activity. The country is waiting—as it has waited since December—for some definite action on the currency question. There may be wide differences of opinion as to what measure Congress should adopt, but all business men agree that further delay and uncertainty will exercise a most disastrous influence upon the spring trade, to which they have looked forward as promising to repair, in part, at least, the losses of the panic. Unless some decision is reached, the spring trade will be a general disappointment.

The movements in foreign trade for the week have been as follows:

IMPORTS.

	1872.	1873.	1874.
Total for week....	$7,170,217	$9,404,883	$8,643,543
Prev. reported....	69,443,308	73,070,728	62,042,909
Since Jan. 1.......	$76,613,525	$82,475,621	$70,686,452

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Anvils	112	$1,103
Brass goods	16	2,013
Bronzes	8	1,087
Chains and anchors	170	7,381
Copper		392
Cutlery	81	37,236
Guns	145	9,596
Hardware	60	6,663
Iron pig, tons	349	10,281
Iron sheet, tons	18	2,204
R. R. bars	3,750	81,197
Iron cotton ties	574	2,207
Iron, other, tons	92	5,957
Iron ore	620	3,398
Lead, pigs	3,263	18,928
Metal goods	163	17,467
Needles	5	5,898
Old metal		1,609
Saddlery	5	868
Steel	619	6,925
Silverware	1	150
Tin, boxes	15,607	133,048
Tin, 1,583 slabs	66,522	19,533
Wire	177	3,608

EXPORTS EXCLUSIVE OF SPECIE.

	1872.	1873.	1874.
For the week...	$4,383,985	$5,398,314	$5,338,461
Prev. reported...	37,587,344	44,299,975	47,412,349
Since Jan 1.....	$41,971,329	$49,698,289	$52,750,510

EXPORTS OF SPECIE.

Total for the week	$343,112
Previously reported	5,223,167
Total since January 1, 1874	$5,566,279

Government bonds closed as follows:

	Bid.	Asked
U. S. Currency 6s	116⅜	116⅞
U. S. 6s 1881, reg	119⅝	119⅞
U. S. 6s 1881, cou	120⅛	120⅜
U. S. 1862, 5-20 reg	116⅝	117
U. S. 5-20 1862, cou	117	117¼
U. S. 5-20 1864, reg	119	119⅜
U. S. 5-20 1864, cou	119	119⅜
U. S. 5-20 1865, reg	119	119¼
U. S. 5-20 1865, cou	120⅛	120⅜
U. S. 5-20 1865, reg. new	118⅛	118⅜
U. S. 5-20 1865, cou	118⅜	118¾
U. S. 5-20 1867, reg	118⅝	119
U. S. 5-20 1867, cou	119⅜	119⅝
U. S. 5-20 1868, reg	118	118¾
U. S. 5-20 1868, cou	119	119⅜
U. S. 10-40 reg	113⅛	113⅜
U. S. 10-40 cou	113⅛	113⅜
U. S. 5s 1881 reg	114⅛	114⅜
U. S. 5s, 1881 cou	114⅛	114⅜

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	105⅛	104⅝
Lake Shore	79⅛	78¾
Rock Island	106⅛	105⅜
Del. Lack. and Western	110⅛	109¾
Wabash	48⅛	46⅝
Harlem	131⅛	130⅝
Western Union Telegraph	75⅛	73¾
Northwestern	54⅛	52¾
Northwestern Preferred	73⅛	71⅜
Milwaukee & St. Paul	43⅛	42⅜
Pacific Mail	43⅛	42⅜
Erie	45⅛	44⅜
Ohio & Mississippi	31⅛	30⅜
Union Pacific	34⅜	33
C. C. & Ind. Central	31⅛	29⅞
Atlantic & Pacific Preferred	18⅛	17⅜
Hannibal and St. Joseph	31⅛	30

GENERAL HARDWARE.

During the week under review there have been very few changes in the prices of American Hardware. Trade is generally reported good, although as usual some houses are complaining. There are but few buyers in the city, and the bulk of the business transacted is by letter.

The American Butt Company, under date of the 4th instant, quote the following discounts on their goods:

Common Fast Joint Butts	dis. 50 ₰
Common Loose "	dis. 60 ₰
Mayer " "	dis. 50 ₰
Parliament " "	dis. 50 ₰
Reversible Loose Pin Acorn Tipped Butts, all kinds	dis. 45 ₰

Parties whose net orders for Butts alone, amount to $250 for each six months ending June 30th and December 31st of each year, will be entitled to a discount of 5 per cent. on net.

The Reading Hardware Company have just issued a new catalogue of their goods, fully illustrated. It shows a number of new articles, including a line of Bronze Metal goods, such as Drawer Pulls, Cupboard Catches, Sash Fasts, Cupboard Turns, Door and Flush Bolts. There are also additions to their former line of Brass, Cast Iron, Japanned and American Dark Bronze Hardware. Fernald & Sise are their New York agents.

There is a fair legitimate business doing in foreign Hardware, and the total absence of any speculative inquiry is a subject of comment. However importers may incline toward selling large lines for future requirements, we think this conservatism on the part of dealers commends itself as a prudent measure, and one that will tend to increase confidence in the permanent stability of the trade. The orders in the hands of importers are for general assortments, and some that we were shown would aggregate considerable amounts. Nearly all of them bear out the prevailing impression that the dealers throughout the country ran their stocks down to the lowest possible ebb during the financial crisis that marked the closing months of 1873. There are few changes of importance to notice in the matter of prices. The English market is reported a shade weaker on Coil Chain and Traces, but we have had no advices of any actual decline. Coil Chain is quoted in this market at the following figures for unbroken packages:

3-16	¼	5-16	⅜	7-16	½ inch.
13	9¾	9	8⅛	8⅛	8 cents, gold.

6½-10-2 Traces are quoted at 62 cents, and 7-10-2 67 cents, all gold, by the cask—for broken packages ¼ cent per lb. advance on these figures for Coil Chain is a fair quotation, and 6½-10-2 Traces are offered in a small way at 63 @ 65 cents, according to quantity. Peter Wright's Anvils are unchanged, and we continue to quote 12 cents per lb., gold, for sizes under 250 lbs.; heavier Anvils, ½ cent extra. Wilkinson's Sheep Shears are offered at a discount 20 per cent. from stock, but this figure would be shaded for an importation order. We quote Brades Trowels discount 10 per cent. and Wilson's Butcher Knives, Steels and Shoe Knives discount 25 per cent.

Nails remain in about the same condition as noticed for several weeks; the demand is fair for the season, and prices are firm and unchanged. We quote Nails in lots of 100 kegs and under at $4, net, for 10d. A cash buyer of a large lot, say 500 to 1000 kegs, could possibly shade this figure a trifle.

Trade in House Furnishing Goods, Tinners' Trimmings, &c., does not seem to come up to the general anticipation of dealers. The city trade is more active this week than last, but the demand from the interior has fallen off. There are no changes to note in either lists or discounts for Stamped, Japanned, or Retinned goods.

Geo. B. Walbridge has issued a new price list of the goods for which he is agent. He has lately taken the agency for Sidney Shepard & Co.'s French, Stamped and Japanned Tin Ware. He also represents W. F. H. Amwake, manufacturer of Scandinavian Padlocks, for which goods the following new list has been adopted, subject to a discount of 25 per cent.:

SCANDINAVIAN LOCKS.

2 Keys to each Lock; 12 Charges to each dozen.

These Locks are made in the best manner, with Malleable Iron Cases and Shackles. Are handsomely finished in Black, Red or Bronze, as ordered.

	Per dozen.
No. 5, Six Wrought Iron Tumblers	$12·00
Extra Keys	2 75
Blank "	1·25
Weight per doz., 8½ lbs.	
No. 10, Nine Wrought Iron Tumblers	15·00
Extra Keys	3·00
Blank "	1·50
Weight per doz., 9½ lbs.	
No. 15, Ten Wrought Iron Tumblers	18·00
Extra Keys	3 75
Blank "	1·75
Weight per doz., 19 lbs.	
No. 20, Twelve Wrought Iron Tumblers	22·50
Extra Keys	4·50
Blank "	2·00
Weight per doz., 28 lbs.	
No. 25, Fourteen Wrought Iron Tumblers	27·50
Extra Keys	5·25
Blank "	2·25
Weight per doz., 32 lbs.	
No. 30, Sixteen Wrought Iron Tumblers	35·00
Extra Keys	6·00
Blank "	3·00
Weight per doz., 50 lbs.	

Mr. Walbridge manufactures now, among other things, the Self-Feeding Blacksmiths' Drill—an article well known in the trade. It is 33 inches in length, and weighs 45 pounds; present price, $7·50 each, less 10 per cent.

The Norwich Lock Mfg. Co., in a circular dated the 3d instant, state that their list of January 6, 1874, has been changed as follows:

Knobs.

Nos. 1000, 1010, 1015, 1200, 1201, 1202..	Per doz.,	$2·00
" 1020, 1030, 1035, 1205, 1206, 1207..	"	2·75
" 1040, 1041, 1212, 1213	"	6·50
" 1063, 1064, 1214	"	7·00
" 1045, 1050, 1055, 1060, 1065, 1070, 1209, 1210, 1211	"	9·00

Drawer Pulls.

No. 1, Tucker Bronze	Per gross,	$11·00
" 2, "	"	9·25

Chest Handles.

No. 1, Iron Japanned	Per doz.,	$2·75
" 2, "	"	3·75

Their discount on general Lock goods is the same as other makers. On Glass Knobs and Bell Pulls they take 25 per cent. from their list of May 1, 1873.

W. P. Kellogg & Co., manufacturers of Curry Combs and other Hardware, have removed their New York office and sample room from 118 to 84 Chambers street, and have arranged with F. Wiebusch to represent them. They have added a line of Ebony Handled Curry Combs to their assortment, and have discarded the use of malleable iron in the Wire Shank Combs, making them now entirely of wrought iron, which makes them much stronger than any similar goods made of malleable iron. Their line of Curry Combs is now very full and complete. They inform us that their Empire Portable Forge (advertised on page 34) is selling rapidly, and giving excellent satisfaction. From what we hear of this Forge, we judge it to be a very good article, and well worthy the attention of our readers.

As some irregularity has existed in the action of manufacturers of Bolts and Nuts, in regard to adhering to the standard lists, a correspondence has taken place between Mr. Sternbergh, President of the Association of Bolt and Nut Manufacturers, and the manufacturers who are members of the association. Letters have been received from all the members, who express themselves unanimously in favor of adhering to the following resolution adopted at the meeting at Pittsburgh, June 11th, 1873:

"*Resolved*, That the term 'Small Nuts and Washers' shall apply only to Nuts and Washers for ¼ to ⅜ Bolt inclusive; and that the term 'Large Nuts and Washers' shall apply only to Nuts and Washers for 7-16 Bolt and upward; and that manufacturers may quote a special discount for Small Nuts and Washers differing from their discount for Large Nuts and Washers, and may make a larger or smaller discount for Washers than for Nuts, at their option; and that manufacturers making quotations shall specify whether 'Small Nuts and Washers' are intended, or 'Large Nuts and Washers,' and quote only one discount for all small Nuts, and one discount for all large Nuts, and one discount only for all small Washers, and one discount for all large Washers."

Mr. Sternbergh states that he has personally visited New York and the East with the view of securing the united action of all manufacturers on this subject, and found a unanimous desire, not only among manufacturers, but among many dealers, also, for the preservation of the standard lists and uniform mode of quoting discounts. To prevent misapprehension, we may remark that there is no desire to prevent the manufacturers from quoting any price they like, but only to secure their adherence to the standard lists, with one discount for small Nuts all through and one for large Nuts.

Wiley & Russell, Greenfield, Mass., have published the following list for Grant's Lightning Screw Plate, Taps, Dies, etc. Complete with Taps and Dies for following seven sizes: ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾ inch. Price, $25. Following is the list of prices separately of different sizes of Taps and Dies (with or without collets), which may be ordered, with plates, assorted to suit buyers.

Sizes.	Number Threads to inch.	Prices of Taps each.	Prices of Dies with Collets.	Prices of Dies without Collets
¼	18 & 20	$0·50	$2·00	$1·00
5-16	16 & 18	0·55	2·00	1·00
⅜	16 & 18	0·60	2·15	1·15
7-16	12, 14 & 16	0·70	2·30	1·30
½	12, 13 & 14	0·80	2·50	1·50
9-16	12 & 14	0·90	2·75	1·75
⅝	10, 11 & 12	1·00	2·90	1·90
11-16	11 & 12	1·20	3·10	2·10
¾	10	1·40	3·35	2·35

Price of Plate alone, with Key, $5.

They say of this tool that "it will do five times the work possible with any other Screw Plate. The threads cut with it are far more perfect than can be made with any other hand tool, and equal to the best machine work, being neatly and sharply cut out of the bolts, instead of being bruised upon them, so that no burr is raised above the true size. It finishes its work at one cut, notwithstanding which its operation is easier than the first trial with the common plate. Nuts and bolts threaded with it need not be matched and kept together—they always correspond without trying and fitting. The dies are adjustable, for wear so as to keep the exact size of the taps, and to allow of nuts and bolts for different purposes being made to fit together tightly or loosely, as desired. Until absolutely worn out, they are always exactly true. When used up they can be replaced, the plate and collets remaining good." An illustration of this Screw Plate will be found in advertisement on the 29th page.

IRON.

American Pig.—The demand for all descriptions of Iron continues exceedingly dull, and but few transactions have been consummated. Although some few contracts for season delivery have been made, the Lehigh companies are generally refusing to fix prices, except for early delivery, for which there is not much demand. Prices are still well maintained, and we quote: No. 1 Foundry, $35 @ $36; No. 2 Foundry, $33 @ $34; Gray Forge, $29 @ $31. The Uhler Furnace, at South Easton, has gone into blast. The Crane Company make no sign of resuming. Their heretofore uninterrupted career or thirty-two years entitles them to a rest.

Scotch Pig.—The demand for Scotch Pig Iron is down to the lowest limits. Local consumers are not running their foundries more than two to three days a week. Prices are difficult to quote, there is so little demand. No hundred ton lots have been sold within the week. Forty tons Gartsherrie sold since our last at $42, leaving the market bare of this brand, which of late is little inquired after. We quote nominally: Coltness, $43 @ $44; Glengarnock, $40 @ $41; Eglinton, $39 @ $40.

Bar.—Manufactured Iron, except in a few specialties, still drags heavily. Good brands sell at from 3·1 to 3·3 cents, with reports of occasional sales, made through some peculiar necessity, at 3 cents. As best Refined Bar made from good quality boiled Pig Iron is to-day costing Eastern mills from $70 to $72 per ton at their works, it can readily be inferred that the stronger mills are not pushing sales with any great persistency.

Rails.—There are no transactions in Rails to note within the week. We quote American at works, $59 @ $60. The last sale we hear of was at $60, time and interest. There have been no recent transactions in foreign, which can be bought at $55, gold, or, perhaps less, for cash.

Old Rails.—We quote $40 @ $41, without business.

Scrap.—We quote Wrought Scrap, from yard, at $42·50. We note the sale of 600 tons stored in Providence, 400 tons in yard here, and 200 tons, part Boiler Iron, all on private terms.

BRITISH IRON MARKET.

(*Specially reported by cable for The Iron Age.*)

WEDNESDAY, March 11, 1874.

Scotch Pig.—The market is quiet, with a steady demand. Prices are weaker. The amount of business is fair. The following are makers' prices:

Coltness, No. 1	100/
Gartsherrie, No. 1	98/
Eglinton, No. 1	92/
Glengarnock, No. 1	96/

Manufactured Iron.—The market is dull, with prices nominal. The demand is falling off, and but little business doing. We quote Best Staffordshire Bars, £11. 10/ @ £13.

Rails.—Prices are declining. There is little business, and small demand. We quote Welsh, £9. 5/ @ £10.

METALS.

Copper.—The sales of Ingot during the week have been very limited, and have only amounted to about 45,000 lb., at 24c. @ 24½c., cash. The tendency of the market, during the last few days, has been toward a firmer feeling, but there is no quotable change in prices of Ingot. Manufactured Copper remains at the prices quoted last week, viz.: Braziers' Copper, ordinary sizes, over 16 oz. per square foot, 35c.; do., 16 oz. and over 12 oz., 38c.; 12 oz. per square foot and lighter, 41c.; Sheathing, (14x48 inches), over 12 oz. per square foot, 33c.: do., 12 oz. per square foot and lighter, 41c.; Copper Bolts, 35c. Yellow Metal is in moderate request at the quotations of last week. Sheathing for vessels, 24c.; Sheathing for reservoirs, 14 to 16 oz., 27c.; and Bolts, 32c., net.

Tin.—The demand for Pig continues limited. Straits are nominal in price. English, has further declined, with sales as low as 21½c., gold, for L. and F., and 23¾ for Refined, closing, however, at 24½ for Refined, and 21¾c. @ 22c. for spot lots of L. and F.; sales have been made of 40 tons L. and F., to arrive, at 22½c. @ 24½c., sellers' option to arrive, or deliver from store; 15 tons Refined, on the spot, 23¾c. @ 24½c.; and 30 do., mostly to arrive and for shipment, 23¾c. @ 24c., gold. The demand for Plates is very sluggish. Prices are firm in England, and so high that importers are slow to accept the present unremunerative rates. We notice sales of 300 boxes Charcoal Tin at $10·50; 250 do. Charcoal Terne, $9·50; 500 do. Coke Tin, 14 by 20, $8·12½; 100 do., 10 by 14, $8·12½; and 300 do. I. C. W., "A. G.," $8, gold.

Lead.—Pig Lead remains very quiet at about 6¼ @ 6⅜, gold, for foreign. There is no change in the price of Western, and there are no sales of any consequence to report. Bar, Pipe and Sheet are quoted at 9c. less 10 per cent. to the trade.

Zinc and Spelter.—There is still a very limited demand for foreign, and the prices quoted are nominally 6¾ to 7c., gold, for Silisian. Western is in limited demand at 7⅛c., currency. Zinc remains at our quotations.

Antimony.—There is no change to record in the price of Regulus, and the demand continues to be very limited.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending March 10, 1874:

Hardware.

Beam & Murray,
Casks 3; anvils, 210
Booth R. W. & Co.
Casks, 6
Boker Hermann & Co.
Arms, cs., 41
Casks, 16
Mdse. pkgs., 34
Brown Bros. & Co.
Chains, 8
Arms, pkgs., 1
Carr & Rockafeller,
Cases, 8
Field A. & Co.
Casks, 86
Chains, cks., 32
Mdse. pkgs., 76
Fuller Bros.
Files, cks., 8
Edge Tools, cks., 5
Grass Hooks, cks., 6
Curry combs, cks., 8
Cutlery, cs., 5
Chains, cks., 60
Frasse P. A. & Co.
Mdse. pkgs., 1
Hilger E. & Sons,
Mdse. pkgs., 3
Harmar Wm. & Co.
Mdse. pkgs., 2
Lodvie E. & Co.
Cases, 2
Lau & Garlichs,
Mdse. pkgs., 22
McIlvain R. J.
Cases, 1
Mason John W. & Co.
Wire rope, coils, 6
Russell & Erwin Mfg. Co.
Files, cks., 1
Schoverling & Daly,
Mdse. pkgs., 2
Schuyler, Hartley & Graham,
Mdse. pkgs., 124
Spies, Kissam & Co.
Mdse. pkgs., 1
Squires Lewis L. & Sons,
Casks, 3
Wire rope, coils, 7
Van Wart & McCoy,
Mdse. pkgs., 3
Van Nest A. R. & Co.
Packages, 11
Wiebusch F.
Mdse. pkgs., 26
Casks, 6
Chains, cks., 32
Ward A.
Mdse. pkgs., 6
Order.
Files, cks., 6
Ironware, cs., 42

Iron.

Crocker Bros.
Pig, tons, 100
Goddard & Bros.
Boxes, 100
Henderson Bros.
Pig, tons, 200
Lang W. Bailey & Co.
Bars, 834
Bundles, 90
Oelrichs & Co.
Casks, 640
Order.
Fish plates, bdls., 240
Pig, tons, 205

Steel.

Brown Wm.
Cases, 21
Casks, 1
Garvin E. L. & Son,
Bundles, 144
Hugill Chas.
Bundles, 40
Hogan John,
Bars, bdls., 13
Mdse. pkgs., 24
Kennedy J. S. & Co.
Bars, 73
Naylor & Co.
Steel tires, 4
Sheet, cs., 14
Piersons & Co.
Bundles, 203
Order.
Bars, 408
Bundles, 1760
Rails, Bessemer, 699
Rails, 2146

Metals.

Benkard & Hutton,
Tin plates, pkgs., 12
Byrnes Joseph & Co.
Tin, ingots, 459
Tin plates, bxs., 1725
Brown Bros. & Co.
Tin, slabs, 220
Bank of British North America,
Tin, slabs, 221
Baring Bros. & Co.
Tin, slabs, 221
Bruce & Cook,
Tin, boxes, 1173
Dickerson J. S. & Co.
Tin and terne plates, bxs., 1297
Davison E. F. & Co.
Scrap copper, bbls., 332
Grund F. & Cerero,
Tin plates, bxs., 687
Lead, pigs, 160
Morris G. A.
Scrap, lots, 1
Phelps, Dodge & Co.
Tin plates, bxs., 8276
Order.
Tin, slabs, 120; ingots, 230
Tin and terne plates, bxs., 12,752

OLD METALS, PAPER STOCK, &c.

The dealers in Old Metals, Paper Stock and other materials relating to the junk trade, report a fair amount of business, at the prices prevailing for the last few weeks. The dealers' purchasing prices are as follows:

Old Metals.—Copper, 18c. per lb.; Yellow Metal, 13c.; Brass, 13c. @ 14c.; Composition, heavy, 14c. @ 15c.; Lead, solid, 5½c.; Tea Lead, 5c.; Zinc, 4c. @ 5c.; Pewter, No. 1, 21c.; do., No. 2, 8c. @ 12c.: Spelter, 5c. @ 5½c., Wrought Iron, 1½c.; Sheet do., ½c.; Cast, do., ¾c. @ 1c.; Machinery, do., 1¼c.

Rags, &c.—Canvas, Linen, 5c. @ 5½c.; do. Cotton, No. 1, 5½c. @ 6c.; No. 2, 2½c.; White, No. 1, 6½c.; No. 2, 4c.; Colored, do., 2c. @ 3c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 6c.; Gunny Bagging, 1¼c. @ 1⅛c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c. @ 3½c.; Book Stock, 4c. Waste Paper and Scraps, 1⅛c.; Kentucky Bale Rope, 4c. @ 4½c.; Oakum Junk, No. 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c.; Grass Rope, 3½c.

PHILADELPHIA.

PHILADELPHIA, March 10, 1874.

There is a little more vitality in the Iron market than at my last report, although the improvement is very slight, and confined, principally, to Rails. Pig metal is very quiet, but at the same time very firmly held, and notwithstanding all the statements of large stocks on hand, &c., furnace companies will not sell below quotations here given, and certain grades of Pig metal, such as Gray Forge, are positively scarce. In Manufactured Irons there is comparatively little doing here, but a fairly active business in Pittsburgh, where the mills are mostly on double turn. Bars have been quoted on the street as low as 2·8c., but we can hear of no positive transactions below 3c. per lb., which is certainly low enough. Rails are in somewhat greater demand at a slight advance, one sale, quoted below, showing $3 per ton better than last reports, but this must be under exceptional conditions. Old Rails are without change to note, and Scrap continues scarce and wanted at previous quotations.

The following prices fairly represent the market at this date:

PIG IRON—No. 1 Foundry, $34·50 to $35; No. 2, $32 to $33. Gray Forge, $29 to $30, and scarce.

BARS—3c. per lb.

RAILS—$65, at works.

OLD RAILS—$40 to $42.

SCRAP—$40 for choice selections.

The sales include, in addition to the usual small lots of Foundries, 1000 tons White and Mottled at $25, at furnace; 2000 tons 40 lb. Rails for Western delivery, equal to $80 per ton at St. Louis, those for a Southwestern road; 1000 tons Rails from a Lehigh mill, reported at $68, at works. Some considerable sales of Rails, amounting to 8000 to 10,000 tons, are in the market, but not closed. Transactions in Old Rails are limited to the actual requirements of consumers, no speculative purchasers being to hand.

PITTSBURGH.

PITTSBURGH, March, 1874

PIG IRON.—The stagnation which has characterized the Pig Iron trade for several weeks past still continues; but notwithstanding the indications are not very bright at this writing, it is scarcely possible that this depression can hold out much longer. Some of the mills will soon be forced to buy or stop, and it is pretty certain that they will not choose the latter. Prices continue very irregular, so that it is impossible to give accurate quotations. Some sales of Gray Forge were reported this week as low as $29, 4 mos., and $28, cash, but these rates are very generally considered below the market, and it is possible the iron in question was not strictly first-class. So far as I can learn, there is but little offering under $29 to $30, cash and time, and some owners are refusing to sell under $30 to $31. There are, however, some producers who are pressed for funds, and are obliged to realize regardless of the price; and they are the ones that are selling the cheap Iron. They must have money to meet maturing obligations, and I suppose they think that they might as well have their product shaved as their paper, and while it exerts a depressing influence on the market, no fault can be found, as people very frequently have to pursue a certain course which they would not if they could help themselves, and this applies to the case in point. It is said that the furnaces in and around this city can turn out good Forge Irons at a cost of about $28, from which it will be seen that the margin for the producer, at $30, is very slender, even at the reduced cost of labor, ore and fuel, after taking interest on the investment, and wear and tear into consideration. The furnaces, in the Mahoning and Shenango Valleys, so far as I can learn, cannot make Iron any cheaper than the furnaces here, and with the cost of transportation from $2 to $2·50 per ton against them, they would lose money on every ton delivered in this market at present rates. Thus it will be seen that not only is trade very much depressed, and in an exceedingly unsatisfactory shape, so far as the producing interest is concerned, but what is worse still, there is not much prospect of any material improvement. There will, no doubt, be an increased demand, and that, too, within the next few weeks; but the prospects for an advance, which is more important just now to the producer, is not very encouraging.

MANUFACTURED IRON.—The market during the past week has been fairly active, and while, as noted in my last report, orders are not coming in so freely, the mills are all busy, and the most of them are reported as working up to their full capacity. In regard to prices there has been no change recently, but the feeling is weaker, in sympathy with the raw material, and it is hinted that a round lot could probably be contrated for on rather better terms to the buyer than could have been obtained a month ago. Notwithstanding there is a lull just now, the prospects are generally regarded as being favorable for a good spring trade, although manufacturers are calculating upon small margins, and it is almost certain that their expectations in this respect will be fully realized.

NAILS.—There is a continued good demand. The factories are all busy, although not working to their full capacity, and prices are firm and fully sustained—four dollars, with 2 per cent. off for cash. There will be a meeting of the Nail Association on Thursday next, but it is not expected that there will be any change made in the card in consequence of the weakness developed within the past few weeks in Pig Iron.

STEEL.—Orders are reported as coming in quite freely, and manufacturers generally report that they have all they can do. Trade is better than it has been at any time this year, and the outlook is very encouraging. In regard to prices, there has been no important change in the card for some time past.

SCRAP IRON continues exceedingly dull, in sympathy with Pig, and there is scarcely enough doing to establish quotations.

WROUGHT TUBING.—There is rather more doing, but there is still room for improvement. Discounts on the new list has been reduced to 25 per cent.—it was 50 to 60 on the old. It is hoped and expected that there will not be so much cutting since the new card and discount have been adopted, although this is a matter that has yet to be demonstrated.

WINDOW GLASS.—The situation has not changed much during the past week. No additional factories have been started up, although manufacturers are already to resume as soon as the blowers are willing to accept the reduction in wages, but not until then.

PETROLEUM.—This important Pittsburgh interest is very much depressed, and nearly all the refineries have been stopped. At present rates there is no margin whatever for the refiner; many of them assert that there would be an actual loss, hence they have very wisely stopped making it. The foreign markets are reported overstocked, hence the export trade is very meagre.

The Pittsburgh *Commercial*, of March 7, 1874, says: Complete stagnation is the best term that we can apply to the condition of the market for Pig Iron this week, as there are literally no transactions, except for very small lots which are required to keep up mixture, and are even then sold at or below the cost of production. As the spring advances we must expect some change; for our mills are using up large quantities of iron every day, and will soon exhaust the stocks which were bought during December and January, and must either buy more stock or stop their works. We therefore expect to see a more active demand before very long—but it is impossible now to say whether the price will be above or below that obtained during January. We are reported the following sales:

BITUMINOUS COAL SMELTED FROM L. S. ORE.

100 tons Gray Forge	$28·00—cash.
200 tons No. 1 Mill, red short, at Furnace	30·00—4 mos.
30 tons No. 2 Foundry	32·00—4 mos.
50 tons clear Gray Forge and Mottled	27·00—cash.

CONNELLSVILLE COKE.

200 tons No. 1 Mill Iron	$29·00—4 mos.
40 tons No. 1 Mill Iron	30·00—4 mos.

CHARCOAL, BLOOMS.

100 tons Charcoal	$90·00—4 mos.

CINCINNATI.

Messrs. ADDY, HULL & Co., under date of March 9, write us as follows: There is no marked improvement in demand, the dullness of the market affecting nearly all grades alike. There appears to be some awakening in the Car Wheel trade, which has resulted in a few sales at reduced prices.

HOT BLAST CHARCOAL.

Hanging Rock No. 1..⅌ ton..	$38·00 @ 40·00—4 mos.
" No. 2	35·00 @ 37·00—4 mos.
" Forge	30·00 @ 32·00—4 mos.
Tennessee No. 1	37·00 @ 38·00—4 mos.
" Forge	30·00 @ 32·00—4 mos.
Alabama No. 1	38·00 @ 40·00—4 mos.
Missouri No. 1	38·00 @ 40·00—4 mos.
" No. 2	35·00 @ 37·00—4 mos.

HOT BLAST STONE COAL.

Missouri No. 1.... ⅌ ton..	$37·00 @ 38·00—4 mos.
" Forge	30·00 @ 32·00—4 mos.
Ohio No. 1	35·00 @ 37·00—4 mos.
" Forge	30·00 @ 31·00—4 mos.
Scotch Pig, No. 1	

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel ⅌ tn.	$60·00 @ 66·00—4 mos.
Missouri " "	58·00 @ 60·00—4 mos.
Kentucky " "	55·00 @ 60·00—4 mos.
Tennessee " "	55·00 @ 60·00—4 mos.
Georgia " "	55·00 @ 60·00—4 mos.
Alabama " "	55·00 @ 60·00—4 mos.
Machinery and Forge	55·00 @ 57·00—4 mos.
Blooms	105·00 @ 116·00—4 mos.

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, reports us the following prices under date of March 10, 1874: Trade rules about the same as reported last week, and quotation figures remain firm and unchanged.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ¼ to 1 thick... 1 to 4½ wide by 1⅛ to 2 thick.	3¼c. to 3⅜c. per ℔.
Round and square, ordinary sizes, from ⅜ to 6 inclusive	3¼c. to 3⅜c. "
Hoop Iron, 1½ wide and upward	4½ to 5c. per lb.
Band Iron, from 1¼ to 4 in. wide	4 to 4½c. "
Horse Shoe Iron from ½ to 1 wide by ¼ to ⅜ thick	5·87½c.
Norway Nail Rods	7½ to 8 c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	16½c.
Machinery Steel	11½c.
Cast Spring Steel	11c.
Homogeneous Steel Plate	13c.
Perkins' Horse Shoes, per keg of 100 lbs	$5·87½
" Mule Shoes	6·87½

Common Horse Nails, from 14c. to 18c per pound.

	10	9	8	7	6	
Putnam Horse Nails	23	24	25	26	28c.	per ℔.
Globe Horse Nails	23	24	25	26	28c.	per ℔.

R. R. Spikes.......5 by 9-16 at 3¼c. to 4c per lb.

ST. LOUIS.

Messrs. GARRETT, McDOWELL & Co., under date of 7th inst., send us the following: Since our last report there has been considerable sales of Pig Iron of Bessemer grades to outside parties, also large sales of Forge Irons, which has tended to stiffen the market though not to advance prices. There has also been much more inquiry this week. We look for an improvement in prices, though we do not change former quotations.

HOT BLAST STONE COAL

No. 1 Foundry, from Iron Mountain and Maramec Ores	$34·00 @ 35·00
No. 2 Foundry, from Iron Mountain and Maramec Ores	32·00 @ 33·00
No. 1 Forge, from Iron Mountain and Maramec Ores	29·00 @ 31·00
No. 1 Foundry, Massillon, O	43·00 @
No. 1 " Tennessee Cold Short	36·00 @
No. 1 " Ohio Cold Short	40·00 @

HOT BLAST CHARCOAL.

No. 1 Foundry, from Iron Mountain and Maramec ores	36·00 @ 43·00
No. 2 Foundry, from Iron Mountain and Maramec Ores	35·00 @ 40·00
No. 1 Foundry, from Tennessee ores	35·00 @ 37·00
No. 1 Forge, " "	31·00 @ 33·00

COLD BLAST CHARCOAL.

Car Wheel, from Hanging Rock Ores	60·00 @ 64·00
" Tennessee Ores	55·00 @ 60·00

LOUISVILLE.

Mr. GEO. H. HULL, under date of March 9, writes us as follows: The market is dull for all grades of metal, and prices are unchanged. The usual time, four months, is allowed on quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$40·00 @ 41·00
" 2 " " "	35·00 @ 37·00
" 1 Forge, " "	32·00 @ 33·00
" 1 F'dry, from Tennessee Ores	36·00 @ 37·00
" 2 " " "	34·00 @ 35·00
" 1 Forge, " "	31·00 @ 32·00
" 1 F'dry, from Alabama Ores	36·00 @ 37·00
" 1 " Iron Mountain Ores	41·00 @ 43·00

HOT BLAST STONE COAL.

No. 1 F'dry, from Missouri Ores	35·00 @ 38·00
" 2 " " "	32·00 @ 34·00
" 1 Forge, " "	30·00 @ 32·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	60·00 @ 65·00
" Tennessee Ores	55·00 @ 56·00
" Alabama Ores	58·00 @ 60·00
" Georgia Ores	55·00 @ 60·00
" Missouri Ores	55·00 @ 60·00
" Kentucky "	55·00 @ 60·00

FOREIGN.

GREAT BRITAIN.

Messrs. J. Berger Spence & Co., London, Glasgow and Manchester, under date of Feb. 21, 1874, report:

Metals.—There is not much stirring in this market; prices have again been lowered, but without avail, to stimulate fresh business, and operators are now anxiously looking forward to the opening of the spring trade, when it is hoped the demands for shipment may produce some of that animation which is now so greatly needed by all interested in metals. Scotch Pig Iron Warrants have experienced a further and very considerable reduction, and Makers' Iron has also had to follow suit. The shipments for the past week are returned as 7138 tons, against 8060 tons in the corresponding week of last year. There is considerable latitude in the quotations now given for Middlesborough Pig Iron, for whilst some makers and merchants are willing to sell at very low prices, other smelters are adhering firmly to full quotations, which they anticipate to be able to realize shortly. There is little doing in Manufactured Iron, and prices are easier for some descriptions. A fair number of sales are taking place in Chili Bar Copper, and a moderate business is doing in English at unaltered rates. There is no change in the value of Tin, but the tone is steadier. The legitimate demand for Lead is keeping the smelters fairly supplied with orders, and although late complications might have seriously depressed this metal, they have not done so to any great extent, and present quotations may be taken to represent its actual value. Spelter continues quiet. Quicksilver again dearer.

IRON—"Ayresome" Yorkshire Pig Iron, No. 1, 95/; No. 2, 90/; No. 3, 87/6; No. 4 (Foundry), 85/; No. 4 (Forge), 85/ net cash, or 2/ extra 4 months' bills. Scotch Pig warrants, 87/6 to 90/. Staffordshire Bars, £11 to £14. Hoop Iron, £13. to £14. Gas Tubes, 52½ per cent. off new list. Boiler Tubes, 30 per cent. discount.

COPPER.—English Tough Ingot, £88 to £90. Chili Bars, £78 to £79.

TIN—English ingot, nominal, £110 to £112. Straits, £107 to £108.

TIN PLATES.—Best Coke, I. C., 28/ to 30/; Charcoal, I. C., 31/ to 36/ per box.

LEAD.—Best English Soft Pig, £23 to £23. 10/. Refined Red Lead, £26 to £27.

ANTIMONY.—French Star, £53 to £54.

SPELTER.—Silesian, £24. 10/ to £25. English, £25 to £26.

FRANCE.

(*Moniteur des Interets Materiels.*)

PARIS, Feb. 22, 1874.—*Metals.*—The Metal markets of Europe have not been in a satisfactory condition during the week; business has been restricted, prices, although in favor of purchasers, have not been sufficiently so to cause a revival in the demand, and to produce some degree of stability. *Copper.*—Although there have been signs of an increase of activity at London, no extensive dealings are reported, and in Liverpool settled down to greater steadiness. Stock at Liverpool and Swansea, 21,900 tons against 24,900 in 1873, and 12,800 in 1872. A fresh decline has occurred in our own market, and Chili bars, deliverable at Havre, have receded to 205 francs. Havre is heavy, and Marseilles quiet at 215 for Spanish. All the German markets are lower; between 30 and 31 thalers at Berlin with considerable weakness. Hamburg is heavy at 122 marks, Minnesota. Tin has, from great weakness, returned to greater steadiness at London, while Liverpool was but faintly supported. At Paris we have had another decline, and Banca, deliverable here and at Havre, is down to 300 francs. The most remarkable breakdown has occurred at Marseilles, where a sudden decline of 30 francs the 100 kilos took place. The production of Tin has of late been on the increase, large quantities are afloat for Europe, and in England some 40,000 slabs were closed out under stress of large failures. Straits Tin at Marseilles is down to 290 francs. Tin is neglected and weak in the German markets: Banca at Berlin, 39⅞ to 41 thalers, and at Hamburg, 130 to 135 marks. *Lead.*—There is no particular change to be reported in this metal. Buyers show little anxiety to operate, and but a limited business is done. London and Liverpool are quiet. At Paris the metal is but feebly sustained and business languishes. French and Spanish, here and at Havre, 58 francs. Germany shows little change; Berlin is firm at 7⅝ to 8¼; Hamburg weaker at 25⅝ to 26 marks. At the Laurium mines, in Greece, now yielding 30 tons of Lead for export daily, all the machinery has arrived for the erection of new smelting establishments, there being quite an accumulation of argentiferous Lead Ore in excess of the usual daily production alluded to, that is to say, that which has been extracted during the past few years. This will be the first metallurgical enterprise on a really large scale undertaken in the kingdom. *Spelter.*—This metal has not been sustained at the rates lately current, and has followed in the wake of the other metals in its downward course. Paris has formed an exception, and has kept steady at 65 francs. Marseilles is also steady. Nothing has been done in Germany, where prices are nominal. Berlin quotes W. H., 8⅝ to 9 thalers; Hamburg, 25¼ marks. *Iron.*—Although the general aspect in France has not improved, a better opinion manifests itself since Coal has been considerably reduced. There is, in the meantime, no demand. The fortresses of France are to be Steel Plated, which will principally give work to the Loire establishments, and, at all events, furnish one of the elements, in addition to the many in prospect, for the revival of metallurgical industry in our midst. Great efforts are made all over France to stimulate a revival, and we expect a good deal, too, from our navy yards, for the government has in store vast projects. Let us hope, in the meantime, that the tax on freight trains on our railways does not become a law, as it would fall heavily on Iron industry, and completely neutralize all other efforts in the right direction, so far as the revival of trade is concerned. *Coal.*—Coal trade at this center is altogether disorganized at present, and there seems to be no bottom to prices, the downward tendency being accelerated from day to day, fostered as it is from England and Belgium. The profits reaped by our companies, during the past few years, must have been great, indeed, if we are to judge from the money spent by them now for an increase of productive capacity, and in building houses that are to give shelter to larger numbers of miners.

BELGIUM.

(*Moniteur des Interets Materiels.*)

BRUSSELS, Feb. 21, 1874.—*Iron.*—Much to our regret, we have no encouraging news to convey for the week under review. At between 210 and 220 francs, as much Wrought Iron may be had as consumers may stand in need of, and if Rails are not at the same price, but from 10 to 20 francs dearer, this is due merely to some orders still in the market keeping up a semblance of activity. "Alliage" may be had at between 90 and 100 francs, but there is a lack [illegible] the Esperance works. As we may remark that the [illegible]. In Sheet Iron, it is true, some business has been done, with special reference to 4000 tons of [illegible] 3-cylinder system, adopted by one of our rolling mills proves a great success, inasmuch as the company has six months of orders ahead, and thus forms an exception from the universal stagnation in Iron industry in Belgium. *Coal.*—Prices have now apparently found their level and settled down to 18 francs, a 40 per cent. decline since July. The decline was brought about by natural causes, frequently alluded to in these columns, and has been all the more precipitate as the greater portion of the improvement in 1873 had nothing but the artificial in it. In England we have seen analogous causes produce identical effects. The break has been greater at Liege, even, than at Charleroi, owing to the stagnation in Iron industry.

HOLLAND.

(*Koch & Vlierboom.*)

ROTTERDAM, Feb. 17, 1874.—*Tin*—The market is dull. Banca, auction paying conditions, has been dealt in between 64⅞ and 65 guilders, and deliverable from the March and May sales at 65. Billiton, spot, has been done at 64⅞.

EAST INDIES.

(*Aitken, Spence & Co.*)

COLOMBO (Ceylon), Jan. 28, 1874.—*Plumbago*—No business to speak of has taken place, and the market may be considered to close again weaker, but in absence of transactions prices quoted are all but nominal. Shipments to London early in the fortnight were continued on a large scale, but latterly have fallen off, and rates of freight in consequence are on the decline. For the United States we hear of nothing doing. Total exports to date, for London, 1026 tons; and for the United States, 983 tons. It is still uncertain whether the "Minerva," 348 tons, lately chartered, will meet with freight enough for the United States, and she may proceed to London instead. Exchange, 1/11 13-16. We quote Lump in sterling money, free on board, without freight, 38/6; Chip, 189/; and Dust, 105. Freight to New York, 75/.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From our Regular Correspondent.*)

SHEFFIELD, Eng., February 24, 1874.

THE TARIFF BATTLE.

Is there no red pipe stone quarry whereat some beneficent Manitou may gather together the hosts of interested iron masters, steel manufacturers and tariff advocates, and in a few clear, definitive sentences settle the whole matter? We have no such trysting place on this side of the Atlantic, albeit we are as strongly interested in the many phases and final adjustment of the matter as any community you shall find on those shores where Longfellow's legend has planted its place of peace making. I am, unfortunately, without full details as to the latest aspect of the matter, my copy of the *Iron Age* for February 5th not having come to hand, but so far as I am able to gather from the various American excerpts, published by portions of the British press, both sides appear to be coming into the arena well primed and ready for the fray. The Iron and Steel Association appear to occupy a tenable position, and if their arguments can be made good, and supported by clear statistics, I am bound to believe in the strong probabilities of their success with Congress. It does, certainly, appear strange that so much British iron should have been imported into the States at a time when many of your own furnaces, mills and forges stood idle, and American iron could be had at the same figures. Such a state of things, arguing from these premises, can only lead to one of two conclusions—that there is an unreasoning and unreasonable prejudice in favor of British iron and steel in the minds of your consumers, or that British iron can be supplied better and cheaper than you can put into the market similar descriptions of American make. The former of these hypotheses is on the face of it almost absurd and untenable; the latter is disproved and utterly refuted by all the facts which the experience of years and the current knowledge of trade can bring to bear on the question. How, then, can you account for the fact to which I allude, which is recorded in the report of the Iron and Steel Association? Is there some underhand influence at work, some presure of old connections brought to bear upon customers in order to ensure orders? It would be simply ridiculous to imagine anything like "lobbying" in connection with the general public, but it is by no means so clear that in the cases of certain large corporations and undertakings—the stock of which is held very largely in this country—justice is invariably done. However, we have a useful French proverb—*nous verrons que nous verrons*. Richard Cobden was undoubtedly a great man, and a wise one—he was English—but the Manchester school of politicians is not infallible.

THE STATE OF TRADE

is, on the whole, chiefly remarkable for its quietude. The trade seems to be doing next to nothing, and doing it in a praiseworthy manner. Our canny friends over the border have let down the price of pig iron with a run, as the cablegrams have duly advised you, either from a total lack of the customary speculative element or a positive depression of trade. My latest advices lead me to conclude that both these causes have tended to the effect indicated. Speculation has died away, and foreign buyers have been beaten off on a question of prices—Middlesboro' iron being obtainable with lower freight charge at less money. Details as to prices will be found lower down, but I will here remark that I shall not be greatly surprised to see a great and somewhat sudden reaction (in an upward direction from the present standpoint) in warrants, which will considerably enhance makers' prices, before long. One reason for my supposing this to be very probable is the fact that on April first (I believe that is the correct date), the German duties on pig and some kinds of manufactured iron are wholly or partly remitted—hence the present dullness *just prior* to the date, may be succeeded by a largely augmented demand, resulting as I have mentioned. In other parts of the Kingdom matters are very quiet, and prices have a downward tendency. It is a point open to doubt whether there are a score *fully employed* ironworks in Great Britain at the present time. I doubt whether even that number could be found. My own information—as extensive and reliable as is possible, and the interests of your many subscribers demand—leads me to believe that *very shortly* we shall see a material drop in finished iron. The quarterly meetings are getting close upon us; consequently no official fall need be expected before they take place, but I think we shall see a reduction then made. Lord Dudley's bars are £14. 12/6, and a few other best "marked" brands are £14, for instance, yet no sane man would now say that the list *must be*, in reality, retained at those figures, in the face of the fact that the whole trade, with these exceptions, is selling at from £1 to £1. 10/ under the "list" rates. The advance in sheets, alluded to in my last, has taken place, and will be found detailed in its proper place. South Wales does not furnish much intelligence just now, most of the works being but indifferently employed. You will, perhaps, have noticed in the parliamentary returns that Fothergill, the irascible ironmaster, has well and thoroughly beaten Halliday the hot headed, impetuous trades' union leader at Merthyr. The general election has not had a beneficial effect upon trade. Luckily it was "short and sharp," soon on and soon over. Had it lasted many weeks, according to the old style of managing such matters, business would have suffered to a really ruinous extent. As it was, for a fortnight little was done—in fact, a Sheffield silver manufacturer conversationally informed me he hardly received half a dozen orders during that period, whereas, he would usually have had twice as many daily. We have, as you know, lost Gladstone and his "merry men," and now the will of the people, to be Carlylese, presents us with that wonderful thing, that strange spectacle, a conservative majority led by that most versatile politician, Benjamin Disraeli, Esq.! "'Tis a strange world, my masters—a strange world!"

THE SCOTCH IRON TRADE.

Warrants have fallen persistently and considerably. They are now quoted at from 87/6 to 89/, with a quiet business doing. Makers' figures are correspondingly lower, thus: Gartsherrie, No. 1, 103/; No. 3, 95/; Coltness, No. 1, 105/; No. 3, 95/; Summerlee, No. 1, 100/; No. 3, 98/; Carnbroe, No. 1, 98/; No. 3, 95/; Monkland, No. 1, 97/6; No. 3, 91/; Clyde, No. 1, 92/6; No. 3, 91/; Govan, No. 1, 93/6; No. 3, 91/; Langloan, No. 1, 105/; No. 3, 95/; Calder, No. 1, 103/; No. 3, 93/; Glengarnock, No. 1, 100/; No. 3, 95/; Eglinton, No. 1, 95/; No. 3, 93/; Dalmellington, No. 1, 95/; No. 3, 93/; Carron, No. 1, 105/6; Shotts, No. 1, 103/; No. 3, 94/; Kinneil, No. 1, 98/; No. 3, 92/.

Foreign shipments from Scotch ports are still on a smaller scale than last year. Last weeks' shipments were about 7000 tons. Middlesboro' pig iron, on the other hand, is being sent to Scotch ports in augmented quantities. The Scotch manufactured iron trade is quieter, and orders are reported to be falling off. Prices are lower, owing to the fall in pig iron, hence, the trade may probably revive before long. Some firms—such as McFarlane's—which make special articles, are doing well, both for the home, foreign and colonial markets.

CLYDE SHIP BUILDING.

The yards down the Clyde are turning out a respectable tonnage, launches being of almost daily occurrence. A correspondent says: "On Monday, Messrs. Barclay, Carle & Co., of Whiteinch, launched the Udston, a very substantial iron sailing ship of 1750 tons, for Messrs. Potter, Wilson & Co., of Glasgow, to be employed in the Australian trade, and she will be one of the largest sailing vessels in that service. The same day Messrs. R. Napier & Sons launched from their shipbuilding yard at Govan an iron screw steamer of 2500 tons, named the W. A. Scholten, for the Netherlands American Steam Navigation Company, and intended to trade between Holland and New York. Messrs. William Denny & Brothers, of Dumbarton, launched on Monday the Achille, an iron screw steamship of 1900 tons, for the Austrian Lloyds Steam Navigation Company, Trieste; and a number of smaller vessels have also recently been completed."

THE TRADE OF MIDDLESBOROUGH.

Here, too, the demand is falling off, and prices are easier. Both on the Tuesday and Thursday 'change meeting a dull feeling was in the ascendant, and little or no business was done. No. 3 Cleveland pig is to be had as low as 77/, or from that up to 80/, but there is some variation, many nervous producers being willing to effect sales at even lower than the price named. Stocks are very bulky, and are largely increasing. During the month of January alone there was an augmentation of over 12,000 tons, and at the present time there are more than 100,000 tons in the yard of the various makers. This, then, is a direct reason for the current weakness of the Cleveland iron market, and is quite sufficient to account for the prevalent opinion, which is expressed by the merchants of the district, to the effect that we shall yet see a further drop in finished iron. The much desired orders for rails do not come in with that rapidity or regularity that could be desired, and the Cleveland makers assert that the Welsh and Belgian manufacturers are quoting so low that they (the Cleveland makers) are quite out of the fight. Not that they deem their case hopeless. On the contrary, they look with silent satisfaction at the gradual fall in coal and coke, which they trust to see continued by the enormously increased production of the Durham and Northumberland districts, which are their main sources of supply. They are, no doubt, right in this respect, and they say, when fuel is down and ores at a reasonable figure, it shall be strange, indeed, if either Belgium or South Wales shall beat the Middlesborough district—the young English iron giant. In the district quotations are, on an average, about the following: Rails, £10. 5/ to £10. 10/ for ordinary sections; plates, £12. 15/ to £13; common bars, £11. 5/ to £11. 10/; puddled bars, £7. 5/ to £7. 10/; angle and bulb iron, £12 to £13; boiler plates, £15 to £15. 10/; cable iron, £13; nail rods, £12. 10/; rivet iron, £13 to £13. 10/; and ship plates, £13 to £13. 10/.

SHEFIELD AND BIRMINGHAM.

There is little alteration here in the condition of trade. As a whole, business "hangs fire," and few transactions have latterly gone off without an enormous amount of drumming up. The cutlery merchants are not in receipt of other than small orders from the London, Liverpool, Birmingham and Wolverhampton merchants, neither am I able to hear of anything like a real improvement in the number or size of indents from the States. The Canadian market furnishes, from time to time, a few respectable orders for table cutlery, utilitarian pocket knives, and some description of fancy cutlery, but there is no encouragement in advices thence as to the immediate future, although a few months may possibly bring forth better things. The Southern States of the Union, Florida, Carolina, and the New Orleans sections, are taking matchets, plantation hoes, and the like, as, also, are the British West India Islands. Some time ago the South American market took very considerable quantities of Sheffield cutlery, comprising table, pocket and pen knives, with a sprinkling of what one may term *articles de luxe*, as well as certain other goods outside the scope of these remarks. The bulk of these consignments went to Chili, the Western States and Brazil, and there seemed, from the tone of advices to be a likelihood of an immense trade springing up. These expectations, so far, have not been literally fulfilled, yet one cannot doubt that with the sudden and great development of the River Plate district and Brazil by the network of telegraphs now in course of construction; by the introduction of railways into Costa Rica and the other States owning the Central American tableland; by the easier access to the West Coast thus afforded, and by the more general application of the appliances of civilization, an unprecedently wide field for commerce is opened up, mainly for the competition of America, England, Germany, and, to a smaller extent, France. The Emperor of Brazil is no tyro in commercial matters. Such of us as were privileged to observe him pretty closely, during his late visit to Sheffield, came to the conclusion that he is a shrewd hand at business, and that he will, before long, take such steps as shall give Brazil advantages unknown to any other territory south of the equator in either hemisphere, excepting, perhaps, Australia. If your manufacturers are not prepared to make a strenuous and sustained effort to secure a part of this trade at once, I opine they will be late in the field. England already has an immense connection with the countries I have named. At Liverpool alone, the other day, I saw half a dozen laden ships come in from those "distant shores"—back freights by which, as you are aware, can be run very low indeed. Let us, however, "hark back," as the fox hunters say, to the Sheffield steel trade—simply to make the observation that there is no improvement, although some kinds of cast steel have been put down by £1 to £3 per ton. Steel rails are only in moderate request. They are quoted £14 to £16. 10/. Bessemer material meets with a tolerably good demand, but at that new orders are not nearly heavy or numerous enough to balance the loss of those being now cleared off the books. Of the trades of Birmingham I have not so much to say. The remarks just made as to the South American markets have some reference also to "Brummagen," but by no means in any equal degree in certain respects. There is an improvement in the shipping orders, mostly on account of Northern Europe and the United States, while Russian favors for tools, machinery and certain other kinds of hardwares are rather heavier. Sweden and Norway, as usual at this season of the year, are sending in orders for fish hooks, implements, box and other domestic irons and electro-ware. North Germany is asking for Walsall saddlery and other leather goods, locks, screws, tubes and chandeliers, and France continues to send a few fairly good orders for tools, machinery, bedsteads, brass goods and wood screws. Holland is also taking good consignments of a similar class. A Birmingham paper says: "With Spain trade is unsettled and irregular, but with Cadiz and some of the Southern ports business is tolerably brisk in iron hoops, metallic bedsteads, chandeliers, tools and electro-ware. The Levant trade, notwithstanding the increase of manufacturing competition in the South of Europe, is generally steady, though there are some important exceptions to the rule in the cases of Italy and Turkey. For Egypt, orders continue good for sporting guns, machinery, copper ware, lamps and various *articles de luxe*. Naval ironwork, chains, cables, guns, metallic bedsteads and miscellaneous hardwares are in good request for Malta; and the demand from Odessa, Taganrog, and other localities in Southern Russia, is very satisfactory, not only for agricultural implements, but for all classes of iron goods adapted to those markets. United States orders are on the increase for birding guns, chains, traces, iron hoops, curry combs, needles and fancy goods, but are still considerably under the average of the season. Trade with India is temporarily stimulated by the government relief works in connection with the impending famine, and the orders from this quarter for tools, implements, tubes and iron sheets have of late been unusually large. In general hardwares, however, Indian trade at present is dull, and is likely to be duller by and by, when the effects of the famine have fairly made themselves felt. The Japan market is suffering from over trading, but the depression is believed to be only temporary. Cape orders for tools, implements, guns, axles, traces and leather and fancy goods, are well sustained, and the Australian market continues buoyant. As regards the home trade, the most active markets at present are London and Scotland, and the North of England. Edge tools, implements, fencing wire, nails and corrugated roofing are chiefly in demand for the agricultural districts; and japanned tinware, enameled iron goods, jewelry, brassfoundry and electro-ware for the large towns."

I shall not dwell upon the fact that the South Staffordshire firms do not report themselves any better off for work, neither shall I allude to the question of prices, further than to remark that the rise in sheets is as follows: 18, 19, and other gauges up to W G 27, an advance of 10/ per ton; on 28, 29 and 30 W G the advance is £1 per ton. This increase has already had the effect of diminishing the demand. Firms who are pretty well known for their transactions with American firms, and who usually purchase largely of baling hoops at this time of the year, are complaining that the usual specifications have not come to hand in anything like the customary manner, and that other orders are but light. Finished iron of all kinds is easier, but prices are purely nominal and very variable.

SOUTH WALES.

Trade in South Wales is not brisk. At Cyfarthfa puddled bars are being stacked in the shape of houses, and there are rumors that at Nantyglo the works are to be stopped. In no single case is full time, or, indeed, anything approaching it, being worked. The only cargo worth noting last week, save a few odd lots of rails, was one of bars for Paysander. Rail orders are not forthcoming in any great number, but the Welsh iron masters, with their enormous and unrivalled stores of coal and ore on the spot, are forcing prices down to the uttermost farthing, and are apparently determined to make such offers as shall secure every order in the market. I hear that they are tendering for iron rails of ordinary sections at under £10 per ton.

THE METAL TRADE.

Metals are dull all round, but there is no further material fall in value, albeit some descriptions have become easier. Messrs. Vivian, Younger & Co.'s circular says, in speaking of the metals in detail: *Copper*—There has been no further decline of importance in foreign descriptions during the week, and at £78. 10/ to £79. 10/, cash, and with extra prompt, a fair quantity of Chili bars have been sold, part to consumers here and for export to the Continent. 400 tons Chilian regulus sold in Liverpool at 15/9 to smelters, and 1200 tons as we close at 15/6 per unit. In Australian, sales of Wallaroo at £88. 10/ to £89; Burra, £87 for immediate cash, and £87. 10/ to £88, usual terms, £89. 5/ being paid for three months' prompt. The demand for English is limited at £87 to £88 for tough, and £89 to £90 best selected. Some Indian orders for 4 by 4 sheets have been booked at about £95, and strong sheets £96. Yellow metal in fair demand at 8¼d. for sheathing. *Tin*—The market for foreign sorts has shown some reaction in price from the previous decline, Straits selling at from 106/ to 107/6, cash, and 107/ to 108/ March-April delivery, a fair quantity changing hands. At the close holders ask 108/ for cash parcels. Five tons Banca sold at 114/, and 10 tons Billiton, 108/; Australian, 104/ to 106/. At the ticketing on Tuesday last a portion of the Australian ores was withdrawn, about 70 tons selling at £52. 10/ to £64. 5/ for good to fine, and £25. 5/ to £40 inferior. English has ruled irregularly down to 108/ for ingots, but the English smelters are now asking 111/ for ingots and 113/ for refined. 316 tons Australian ores will be offered at the next ticketing, 3d proximo. *Tin Plates*—A fair business doing at moderate prices. *Iron*—Quotations are rather easier, and shipping orders can be placed on better terms. *Spelter*—Demand very moderate. *Lead*—Quiet but steady at £23 to £23. 5/ for good soft English.

The Strikers at Reading, Pa.

A correspondent sends us the following from a local paper of Monday last. He adds: "To-day the same men are out in a card, stating that, as the charges of bad iron, made at the meeting, will come home to them to roost, they deny and will not sanction them." We extract the following:

The strike among the ironworkers of Reading is daily assuming more serious proportions. The workmen of Seyfert, McManus & Co. seem to have the sympathy of all their fellow workmen in the vicinity, and are supported by puddlers, rollers, and others from the different iron establishments. They are encouraged from labor organizations everywhere, and have received delegates from Allentown workingmen, as well as from Easton, Bethlehem and other places. Their proceedings are conducted in an orderly and methodical manner, and there is an earnest determination manifested on the

part of the various speakers that bodes a long struggle. The men out of employment are about three hundred in number, and during the present week it is expected that their number will be three times as large. They had a meeting on Friday evening at Shade's Hotel, on Franklin street, Reading, and then and there decided on the ultimatum to be submitted to their employers. Their declaration is that they will never go to work until the terms in that document are complied with, and an agreement signed to that effect. At the meeting on Friday speeches were made that will best give the reader an idea of the character of the movement. They are thus reported. A gentleman arose and said:

Fellow workmen:—I would like to talk to you as I feel, but my limited education will not allow it. When I left my home after dinner today I happened to look back, and there I saw my little girl leaning out the door looking after me. Its little shoes were worn and torn, and the toes stuck out; the gown was old and soiled, and it was not what a father likes to look at. Coming up the street I passed the house of one of the mill owners. His child also stood in the door. It was dressed in clothes warm and fine. Upon its hands and wrists were jewels and gold. Its feet were wrapped in soft shoes, and at its bidding it might have had bread and honey. Now, in the name of God, is it just? Who earned money for that rich child's father? I answer, we, the workingmen. Yet did not God create both of these children in his own image? Did he not create us, too? Why should we then toil and labor day after day for a miserable pittance, so that when Saturday night comes, and the debts are paid, we have about as much left as when we commenced on Monday morning. No, men; we want to flourish as well as the man who owns the mill. His having more money than we does not make it right for him to compel us to live like dogs!"

A prominent roller next spoke in very forcible language. He revised the prices received and paid for iron. Said that the receipts were enormous as compared to the quality of iron furnished. * * * * * * * * Another point, men; and that is, you should be paid weekly. After you have earned your day's wages an employer has no business with it unless he pays you interest. I believe in the old Jewish custom of daily payments. I have known the time, and it is the custom yet in several mills hereabouts, to make men wait two months for their pay. The employers who do this are shameful speculators, money gamblers, who would rob a poor man if they got a chance. Reading pays less wages than any other city in the State. Philadelphia, with its increased expenses, is far more liberal in its payments. The workingmen of Reading have an opportunity to learn and teach their employers these facts, and if they continue in harmony and unity there can be little doubt of triumphant success."

The meeting was further addressed by workingmen, who narrated their grievances in a plain and straightforward way. There was unusual attention paid to the addresses, and whenever a point was well taken the applause was terrific. Unity in action, silent work and well-tempered determination were counselled by the leading gentlemen. If this was done, it would not be long before every oppressed workingman would take position under the standard of the puddlers and other iron workers of this city. One speaker present spoke in conclusion as follows: "I come here to visit your meeting upon invitation, and I have only a few words to say. I know that the puddlers of the sheet mill of Reading for the last three years have been treated worse than slaves. Instead of providing for their use the proper kind of ore, the puddlers have been compelled to use cinder. When the time the hot iron would boil out, and I can think with you all the terrible torture that followed to your bodies. It is a great wonder your brains were not burned out. Why was this done? Simply to give you more hard labor to do and make more profits for the mill owners. Who can but denounce such unholy traffic, this bartering with men's lives? At the same time they put us on the level with beasts. The iron they furnished by their miserly conduct toward the men was totally unfit for use. By this means they brought odium upon us, ground us in the dust, starved our children, so that they could roll in their wealth, drive fast horses, and live as if God had created them better than we."

Tin—Its Ores, Metallurgy, Properties and Applications.

With the exception of gold and silver, no metal is so much sought after at the present time in all parts of the West as tin. Almost every week the discovery of rich ores of tin are announced, and capitalists are invited to embark in the working of tin mines, and huge swindles have been skillfully manipulated by means of salted tin mines or bogus assays. That a metal so long known and so useful in the arts does not exist in quantities that will pay for working, within all the borders of our extensive mineral country, is scarcely probable, and it is to be hoped that persevering search for it will yet be rewarded by deserved success.

ORES OF TIN, AND HOW RECOGNIZED.

Cassiterite, or oxide of tin, SnO_2, is the common and most valuable ore of tin, containing 78 per cent. of the metal. It is usually found in brown or black crystals, with an adamantine lustre, and so hard as not to be easily scratched by the knife. Both in color and hardness it resembles some species of garnet, but is easily distinguished from the latter by its specific gravity, which is 6·4 to 7·1, while garnet is only 3·15 to 4. Tin ore is both insoluble and infusible, but if heated upon charcoal with soda, before the blow pipe, is reduced to metallic tin, and gives a white coating, which turns bluish green on applying nitrate of cobalt solution. When metallic tin is dissolved in muriatic acid it yields, with terchloride of gold, the purple of Cassius.

Tin ore is met with in veins traversing granite, gneiss, mica, schist, etc. In some instances, as in Cornwall, Malacca and Banca, tin ore is found among the detritus of ancient river beds in a very pure state, and is known as stream tin. Sometimes tin ore resembles dry wood in its colors and in radiated fibrous structure; it is then called wood tin. In Cornwall beautiful crystals of tin stone are found associated with fluor spar and apatite.

The above description will enable a close observer, who has a slight acquaintance with mineralogy, to distinguish tin ore from other similar substances liable to be palmed off upon him as such.

Stannite is a native sulphide of tin, copper, iron and other metals, containing but twenty-five per cent. of tin, and is not worked for it.

REDUCTION OF THE ORE.

The metallurgy of tin presents no special difficulties, but several different methods are employed in different countries. The ore is pulverized, roasted, washed, and then smelted with charcoal, to remove the oxygen. The smelting is effected either in a cupola or in reverberatory furnaces, according to the nature of the fuel. Reverberatory furnaces require good and cheap coal, and are exclusively employed in England. Cupola furnaces, on the other hand, yield a better product from impure ores, and are used in Germany. Crude tin, which results from the smelting of tin ores, contains more or less iron, copper, antimony, bismuth, tungsten, molybdenum, etc., all of which substances render the tin hard, difficult to fuse, and more or less pasty when melted.

The refining process consists of two operations. The first is a liquation, which is effected by arranging the blocks of crude tin on the hearth of a reverberatory furnace near the bridge, where they are heated moderately; the tin melts and flows away into the refining basin, but after a certain time the blocks cease to afford tin, and leave on the hearth a residue consisting of a less fusible alloy containing much iron. The operation is repeated until the refining basin contains about five tons, when the second part of the process begins. Billets of green wood are plunged into the tin bath, and the disengagement of gas from the wood produces a constant ebullition in the tin, raising a species of froth on its surface, and causing the impurest and densest parts to fall to the bottom. The froth, which consists of oxides of tin and other metals, is repeatedly skimmed off. When the tin begins to cool it is ladled out and poured into cast iron molds. The blocks obtained first are the purest.

Perfectly pure metallic tin is prepared by dissolving English tin in nitric acid, washing the oxide with acidified water, extracting the antimony with hydrochloric or tartaric acid, and reducing with charcoal or soot. It can also be precipitated by the galvanic current from solutions of the chloride.

PROPERTIES AND USES.

The white, silver-like color is too well known to need description. It does not tarnish in the air or in water, but is readily attacked by acids, especially hydrochloric. When handled, tin has a peculiar smell, due to the formation on its surface of a chloride from the chloride of sodium in the perspiration. On bending it gives a peculiar creaking noise called the "tin cry." Concentrated nitric acid is without action on tin, but if slightly diluted the tin is oxidized. Metallic tin fuses at 442° F., and is both malleable and ductile.

Granulated metallic tin, for medical use, is prepared by pouring melted tin into a box lined with chalk, and shaking continually until cold. Finely-divided tin is prepared in the wet way by precipitation upon a strip of zinc placed in a hydrochloric acid solution of tin.

Tin is extensively employed for coating iron, brass and lead. Sheet tin is merely sheets of iron coated with tin. The iron is previously scoured, so as to present a clean metallic surface, and then immersed in baths of molten tin covered with a layer of molten tallow to prevent the oxidation of the metal. On being removed from the tin bath the sheets are immersed in a bath of molten tallow to remove any excess of tin, wiped with a brush made of hemp, cleaned with bran, and packed. This process was fully described in *The Metal Worker* of January 24th. Pins, hooks and eyes, small buttons and the like are tinned by being boiled in a tinned boiler filled with water, granulated tin and some cream of tartar. Stolba has invented a method of depositing a thin film of tin upon perfectly clean iron, brass or copper utensils in the cold. A solution of protochloride of tin, containing 5 to 10 per cent., has added to it as much pulverized cream of tartar as will go on the point of a knife. The object to be tinned is moistened with this solution and then rubbed hard with zinc powder. The tinning appears at once. Tin is also employed as a lining for lead pipes for conveying drinking water.

ALLOYS OF TIN.

The number of alloys into which tin enters is countless. Tin alone is not adapted to making castings, but, added in small quantities to other metals, gives them hardness. A few of its most important alloys are given below, together with the usual proportions:

Britannia metal contains 9 parts tin and 1 part antimony.

Pewter, 6 parts tin and 1 part antimony, with various other metals, as bismuth, copper, lead and zinc.

Soft solder, equal parts of lead and tin, 2 parts tin and 1 of lead, or 1 part tin and 2 of lead. The less lead it contains the lower its melting point will be.

Bronze consists of copper and tin, or copper, tin and zinc; the chief varieties are bell metal, gun metal and statuary metal. Bell metal consists of 78 parts copper and 22 of tin; gun metal of 90 parts copper and 9 of tin; the statuary bronze used in the statue of Louis XIV., at Paris, made in 1699, consists of copper, 91·49; zinc, 5·53; tin, 1·70; lead, 1·37. An alloy of tin and mercury has long been in use for mirrors.

The Future of our Manufactures.

The following article, which we take from *The New York Daily Bulletin*, a journal on the picket line of free trade, will be read with interest. We do not agree with the writer in every particular, but he is undoubtedly correct in assuming that the development of the next few years will be in the direction of industrial expansion:

For the last seven years the surplus earnings of the country have been largely invested in the construction of railroads. Since 1866 about 35,000 miles of road have been built and equipped, just about doubling the previous mileage of track. Taking the cost of road and equipment at only $40,000 per mile, which is $15,000 per mile below the estimate given in Poor's Annual, we have $1,400,000,000 as the amount invested in these works within seven years, or at the rate of $200,000,000 per annum. Perhaps fully two-fifths of this amount has been borrowed in Europe, which would leave, say, $850,000,000 of home capital thus permanently invested.

This capital has been diverted from the ordinary productive industries; and although by providing improved transportation facilities its use in this way must largely benefit all our industries, yet it has doubtless prevented an expansion of farming, mining, shipping and manufacturing which would otherwise have been realized. Road has been built much in excess of the actual requirements of our trade, as is abundantly evident from the now bankrupt condition of very many of the new roads; but it stands ready to accommodate any future increase of business; and this over-done condition of the railroad interest will certainly stop the flow of capital in that direction and leave it to take the course from which it has been diverted by the railroad mania.

What, then, is to be the specific drift of the surplus earnings of the country in the early future; or, more expressly, of that portion of our accumulations which the owners, having no satisfactory employment of their own for it, are willing to contribute to corporate undertakings? Will it go into mining? The mining mania of 1863–64, with its wholesale swindling of investors and its worse than barren results, has left so much of the burnt child feeling behind that all attempts to develop mines through corporate capital must at least show the most substantial results before they can secure public subscriptions. We have, however, a large extent of coal and iron lands conveniently located, which, if judiciously worked, may yield more profitable results than have ever yet been realized in those branches of mining; and it seems highly probable that, in course of time, these deposits may enlist a large amount of capital in their development; but with the existing caution toward such enterprises, stock investments of this character must, of necessity, be made slowly and can take up but a small portion of our accumulating earnings.

Will our capital flow into ocean transportation? The general condition of our shipping interest and the symptoms of improvement in our ship yards, especially in wooden shipbuilding, apparent within the past year, suggest that there is room for the employment of an increased amount of private capital in this way; and this inference is strengthened by the fact that confidence has been somewhat shaken, by experience, in iron vessels, and that the high price of iron vastly increases their cost. But the large corporate undertakings which establish extensive lines of steamships upon public subscriptions of capital do not at present appear likely to attract much support; nor does there seem to be much disposition to attempt such enterprises. The past history of our ocean steamship companies, even in cases where we have had a monopoly of the trade to be done, has proved highly discouraging; and we must have much better facilities, and much less oppressive tariff obstructions, as compared with foreign lines, before we can hope to get public subscriptions to such corporations.

Will the schemes of "internal improvement" introduced by the lobbies of Congress and of the State Legislatures attract much capital? We think not; for the public are so disgusted with the corrupt results of these State commitments, that few such schemes will be legalized; and, if they should be freely authorized, the public will not be easily drawn into them, even by the attraction of a government subsidy or endorsement.

The era of State, county and city borrowing has about seen its end for the present; the public having, on the one hand, become exasperated at the enormous local debts saddled upon them, and being, on the other hand, distrustful of the credit of any local government that attempts to further augment its indebtedness. It is not to be expected, therefore, that investors will, for the next few years, put as much of their means into these securities as they have during the late years of general government extravagance.

It remains, then, to be ascertained what are the prospects of capital flowing more extensively than hitherto into our manufacturing industries. We cannot fully consider this broad question within the limits of a single newspaper article, and shall, therefore, at present notice only some of the considerations bearing on the subject, and may recur to the question subsequently.

We think it may be safely stated that our manufacturers, as a rule, have been, during late years, sufficiently prosperous to warrant confidence in subscriptions to manufacturing corporations. There have been exceptions to this rule, and the disagreeable exceptions have naturally attracted much more attention than the success that has been quietly won; but these cases affect very little the general conclusion that the leading branches of our manufactures have made very good returns, during late years, upon the capital invested. One of the best evidences of this prosperity is in the extension of operations that has occurred in almost every department. Taking the period from 1860 to 1870, which includes a great civil war with all its embarrassing drawbacks upon industry, we find, according to the census reports, the status of our manufactures at the two periods to have been as follows:

	1870.	1860.
Number of establishm'ts.	252.148	140,433
Hands employed	2,053,996	1,311,246
Capital	$2,118,208,769	$1,009,855,715
Wages	775,584,343	378,878,966
Value of raw materials	2,488,427,242	1,031,605,092
Value of products	4,232,325,442	1,885,861,676

Thus we find that the extension of our manufactures has very largely exceeded the ratio of growth of population. While the gain in population has been only 23 per cent., the increase in manufacturing capital has been over 100 per cent., and in the value of goods produced, 125 per cent. Such an immense increase in this particular branch of production could never had occurred had the results been unsatisfactory to the employers of the capital—for it is a law in industry that when capital does not realize the average remuneration in a given employment it ceases to flow in that direction or seeks other investment—on the contrary, it implies most conclusively that manufacturing has been found a profitable employment of capital; and yet it will not be seriously questioned that, during the three years following 1870, the prosperity has been much greater than for the ten years preceding. The profits of the iron trade for the last three years have been immense; and the same may be said of the machine trade, and our textile manufacturers, their chronic complaints notwithstanding, cannot plead exception. True, we very frequently hear of the losses of woolen manufacturers, and now and then of the sales of woolen mills; and we are likely to do so until there is a weeding from that trade of a host of small producers who have neither the intelligence, the enterprise, nor the means necessary to good management; but the fact nevertheless remains that the more competent class of mill owners are constantly adding to their machinery, and that there is a steady increase in the number of mills; which facts afford conclusive evidence that the woolen manufacturers, as a class, are making satisfactory profits. The Boston market for manufacturing stocks demonstrates that the value of those investments is less subject to variation than any other kind of share capital, and also that the dividends are more regular and higher than those of our best railroads. These investments are made chiefly by persons living in the immediate vicinity of the companies' operations; and the fact that, with such opportunities for close observation, stockholders are generally satisfied, shows that these corporations are reasonably well managed; better, perhaps, than any other corporate interests, banking alone excepted. With these substantial evidences of the prosperity of our manufactures, it would seem that new manufacturing enterprises would be likely to meet with favorable consideration at the hands of investors, now that so many other sources of investment have been rendered, for the time being, uninviting and unavailable.

Natural Objects as Patterns for Ornamental Metal Castings.

Workers in metals; especially amateur artisans and manufacturers of fancy articles in real and imitation bronze, are often at a loss for appropriate ornamental designs with which to beautify their work. Nature supplies countless forms of beauty in flowers, leaves and living objects, but to carve patterns after such delicate models requires the skill of an artist, and one competent to do the work would charge a high price for his services. How the difficulty can be overcome, and the expense avoided at the same time, we propose to show in this article, to which we invite the attention of young and ambitious mechanics of taste. The value of our suggestions may easily be determined by a few simple and inexpensive experiments.

Fruits, flowers, ferns, grasses, mosses, insects and small animals, may all be used for purposes of decoration, nor does their duplication in metal involve any special skill or knowledge on the part of the model maker. Suppose, for example, some leaves, a rose, a beetle, a frog or a lizard are wanted for some ornamental metal work. After having procured the specimen—and, if it be an insect or animal, killed in the manner least likely to injure its form—the next step is to suspend it by strings in a box which is water tight, or is, at least, capable of holding soft plaster of Paris. Leave, at least, an inch space all around each object. Prepare a mixture of plaster of Paris four parts, and fine brick dust two, mix with water to the consistency of cream. Pour this mixture into the box until it reaches the level of the objects, and then, with a small soft, brush give them a coating of the mixture, rubbing it on fast enough to prevent the formation of bubbles. Then proceed to fill up the box with the mixed plaster. Of course this forms a closed mold, so that the objects cannot be withdrawn. Dry the mold gradually near the fire, gradually increasing the heat until it is red hot. The heat must not be applied too rapidly. The reason for heating is to burn up the objects within the mold and prepare it for the reception of the metal. The holes occupied by the strings afford means for escape of the gas, and also openings through which the molds can be filled with metal. Small sticks may be placed so as to touch the object and reach the upper surface of the mold. When these are withdrawn they leave "gates" through which the metal may be conveniently poured. The openings left by the strings can also be enlarged. After the objects are well burned, the dust and ashes must be blown out, so as to leave the mold clean. A small portion of quicksilver may be poured in and shaken about in order to loosen the ashes, the quicksilver, of course, being poured out, and the remainder of the ashes blown out. The mold is now ready for the casting, but, before the metal is poured in, it should be heated so that the metal may not be chilled.

The metal commonly used for this work is composed of tin, 6 parts; bismuth, 2 parts; lead, 3 parts; melted together in a crucible or ladle. The mold is then filled in the usual way.

If this alloy cannot be obtained, common pewter will do. Perhaps the best metal, on account of the sharpness with which it fills the molds, is one composed of 2 parts of lead and 1 part of bismuth.

Old type metal is also good for this purpose, at least where the forms do not require to be bent to attach them to the surfaces on which they are to be placed. Here we should add again that if the molds are hot the greater the probability of securing perfect impressions.

The mold is of course broken after the metal is cold and the castings removed. We now have an object in metal which far exceeds in delicacy of execution any which could be produced by an ordinary pattern maker. Being in metal it can be manipulated so as to be suitably attached to the pattern which it is desired to ornament. Thus the body of a beetle can be sawn in half and the upper part soldered or tacked upon the pattern. Fern leaves can be bent to conform to the surface, and then soldered fast or secured by tacks. Thus nature does the pattern making, leaving but little of the work for the artisan.

When there is any difficulty experienced in removing the ashes, another plan may be employed for making the mold, namely, forming it in two parts. This, however, does not necessitate the making the mold so as to withdraw the object. The mold box in which the plaster was poured may be half filled with sand, and the object partly embedded in it, taking no care as to whether any projecting parts would interfere with withdrawing the half of the mold on top. When the plaster has been poured on and is set, the box is to be turned upside down and removed from the half of mold already made. The sand is then removed, and the top of the mold placed in the bottom of the box, or else it is to be surrounded by a rim of paper and more plaster poured on to complete the mold. The complexity of the figure within, while it remains, will prevent the two parts from separating, but after burning out the object no difficulty will be experienced, and the ashes can then easily be blown out.

Where the model maker can avail himself of the electrotype process, still another method of making natural objects available for the ornamentation of patterns may be employed. This is to give the objects a coating of copper by electrotyping them. In many cases the objects may be destroyed by heat, and the remaining shell of copper filled with pewter or type metal. This style of work is exceedingly beautiful. Each object must, of course, have a very perfect coating of plumbago before being electroplated.

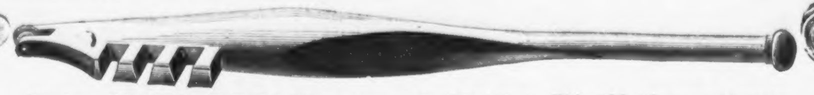
At a recent meeting of the Massachusetts Institute of Technology, in Boston, a communication was read by Mr. David Renshaw, upon a new sectional cast iron boiler, which has been in successful operation for some time past in Hingham, Mass. Very decided advantage over other forms of boilers were claimed.

London Metal Market.

(From The Mining Journal.)

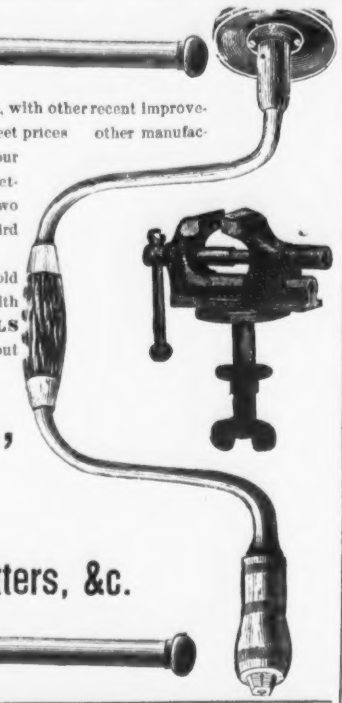
	£.	s.	d.	£.	s.	d.
Copper—℔ ton.						
Best Selected	86	0	0	91	0	0
Tough Cake & Tile	[illegible]	0	0	90	0	0
Sheathing and Sheets	95	0	0	96	0	0
Bolts	100	0	0	101	0	0
Bottoms	99	0	0	101	0	0
Old	85	0	0	—		
Burra Burra	88	0	0	—		
Wire ℔ lb.	0	1	0½	—		
Tubes "	0	1	0½	0	1	1
Brass—℔ lb.						
Sheets	0	0	10	0	0	11
Wire	0	0	10½	—		
Tubes	0	0	11½	0	0	11½
Yellow Metal Sheathing	0	0	8½	0	0	8½
Sheets	0	0	8½	—		
Spelter—℔ ton.						
Foreign on the spot	25	0	0	25	10	0
" to arrive	25	0	0	—		
Zinc—℔ ton.						
In Sheets	31	10	0	32		
Quicksilver—℔ bottle.	19	0	0	—		
Tin—℔ ton.						
English Blocks	101	0	0	111	0	0
Ditto Bars (in brls.)	111	0	0	112	0	0
Ditto Refined	113	0	0	114	0	0
Banca	104	0	0	110	0	0
Straits	105	0	0	107	0	0
* **Tin Plates**—† ℔ box.						
IC Charcoal.........1 qual.	1	17	0	1	19	0
IX "........1 qual.	2	3	0	2	5	0
IC "........2 qual.	1	15	0	1	17	0
IX "........2 qual.	2	1	0	2	3	0
IC Coke	1	9	6	1	11	0
IX "	1	15	6	1	17	0
Canada Plates........℔ ton.	21	0	0	21	10	0
" at works	20	0	0	21	0	0
Iron—℔ ton.						
Bars Welsh, in London	12	0	0	—		
" to arrive	11	10	0	11	15	0
Nail Rods	12	5	0	—		
Nail Rods, Staff'd in L'ndon	12	10	0	—		
Bars	12	10	0	13	0	0
Hoops	14	0	0	15	0	0
Bars at Works	11	10	0	—		
Hoops ditto	13	0	0	13	0	0
Sheets, single, and plates	14	10	0	15	10	0
Pig, No. 1, in Wales	5	0	0	6	10	0
Refined metal ditto	7	0	0	8	0	0
Bars, common ditto	10	15	0	11	0	0
Do, merchant, Tyne or Tees	11	5	0	11	10	0
Ditto, Railway, in Wales	9	15	0	10	10	0
Ditto, Swedish, in London	19	0	0	19	5	0
To arrive	19	0	0	19	5	0
Pig, No. 1, in Clyde	5	0	0	5	5	0
Ditto, f.o.b., Tyne or Tees	4	10	0	5	10	0
Ditto, Nos. 3, 4, f.o.b.	—			—		
Railway Chairs	5	0	0	5	5	0
" Spikes	13	10	0	14	0	0
Indian Ch'coal Pigs in L'don	10	0	0	12	0	0
Steel—℔ ton.						
Swedish, in kegs (rolled)	—			—		
Ditto (hammered)	20	[illegible]		21	0	0
Ditto, in faggots	21	[illegible]		—		
English, spring	28	0		28		
Lead—℔ ton.						
English Pig, common	25	[illegible]		—		
Ditto, LB	23	[illegible]		—		
Ditto, WB	24	10		—		
Ditto, Sheet	24	[illegible]	0	24	0	[illegible]
Ditto, Red Lead	25	0	0	—		
Ditto, White	30	0	0	32	0	0
Ditto, Patent [illegible]	26	10	0	27	0	0
Spanish	21	15	0	22	0	0

* At the works 1s. to 1s. 6d. per ton less. Terne plates 2s. per box below tin plates of similar brand. ‡ Nominal. † Add 6s. for each X.

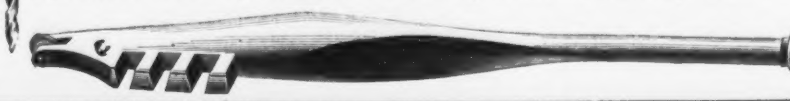



The jaws of **BARBER BRACES** are now made of Cast Steel. This, with other recent improvements, makes them by far the best Brace in market. We are willing to meet prices other manufacturers when their goods are made equal to ours If cheap goods are wanted, our No. 22 and 23 Braces will meet that demand, as we will guarantee them to be better than any other Brace in use, except our first quality. We have made two styles of **Ratchet Braces**, which have been largely sold, and now have a third kind nearly ready which we think is better than either of the others.

Our **BREAST DRILLS** have a chuck with Steel jaws, which will hold round twist drills up to half inch, and will also hold equally well, auger bits with shanks of any shape. The demand for these **BREAST DRILLS** has been so large, that we have not been able to accumulate a stock, but can put in a few with each brace order if wanted.



MILLERS FALLS CO.,
78 Beekman Street, New York.
ALSO MANUFACTURE
Parallel Vises, Glass Cutters, Iron Cutters, &c.

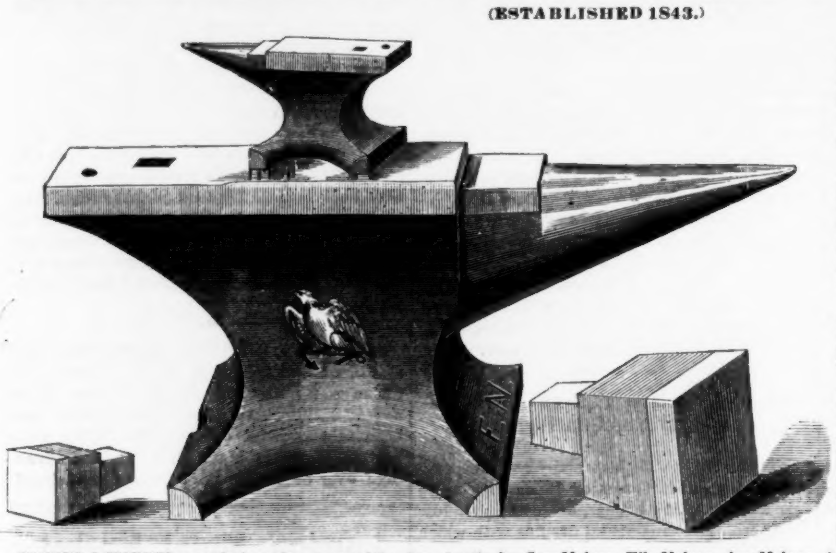


HOWARD PARALLEL BENCH VISE.
MANUFACTURED BY
Howard Iron Works,
Send for price list. **Buffalo, N. Y.**

RUSSELL & ERWIN MFG. CO., New York and Philadelphia, Agents.

NOTICE.
These **Vises** are only manufactured at the **HOWARD IRON WORKS, at Buffalo, N. Y.** and are so stamped. The improvements in these **Vises** which are patented are valuable, and parties who claim to manufacture, and are offering a **Vise** representing it to be the same as the **HOWARD VISE,** are deceiving the Trade.
HOWARD IRON WORKS.

The Fisher & Norris Eagle Anvil Works.
(ESTABLISHED 1843.)



These Anvils are manufactured at the oldest Anvil Factory in this country, and for the past twenty-five years have maintained an excellent reputation among Blacksmiths, Machinists, Tool Makers, &c. They are *superior* to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The working surface is in *one piece* of JESSUP'S BEST TOOL CAST STEEL, which, after being accurately ground, is hardened and given the proper temper for the heaviest work. The *horn* is covered with and its extremity made *entirely of steel.* The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is *warranted to be thoroughly welded and not to come off.*

The best of English Anvils, after a time, become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvils being of crystallized iron, no such settling can ever occur; and the steel face, therefore, remains perfectly true. Also, it has the great advantage that being of a more *solid* material, and consequently with less rebound, the piece being forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as is the case from a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a *hammer one fifth lighter* than that required when using a wrought iron anvil which is more elastic.

FISHER & NORRIS manufacture also, to special order, Anvils for Saw Makers, File Makers, Axe Makers, &c ; also, Copper Smiths', Silver Smiths' and Tin men's Stakes and Blocks, with hardened and polished cast steel faces, and the known Double Screw Parallel Vise.

REDUCED PRICE LIST, November 1st, 1873.
ANVILS weighing 100 lbs. to 800 lbs., 11 cts. per lb.

Smaller Anvils, ("Minims.")

	No. 0	1	2	3	4	5	6	7	8	9
Weighing about	10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.
Price,	$3·50	$4·25	$5·00	$5·50	$6·50	$7·50	$8·00	$9·00	$10·00	$10·50

THESE GOODS ARE SOLD BY OUR AGENTS (with special discounts to the trade).

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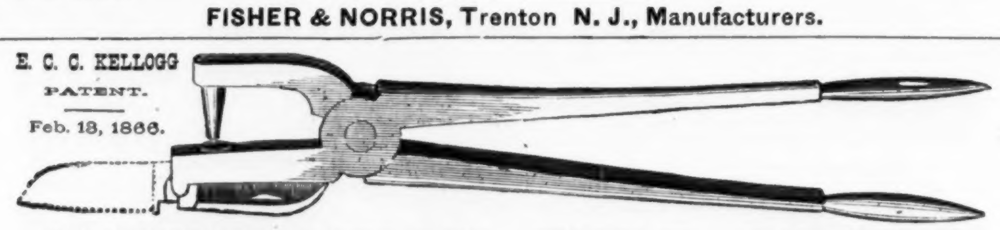
FISHER & NORRIS, Trenton N. J., Manufacturers.

E. C. C. KELLOGG
PATENT.
Feb. 18, 1866.



COMBINATION BELT PUNCH,

Pronounced by those who have used them the handiest and most desirable tool in use of its kind. As will be seen, the combination consists of BELT PUNCH, KNIFE AND AWL,
Also, Needle for Lacing Rubber Belting, so combined that each tool does its specific work and not interfere with either of the others.
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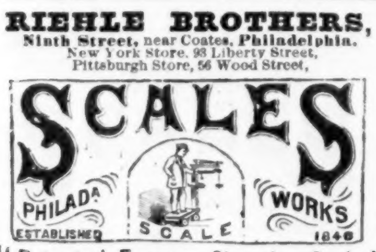

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Double Beam R. R. Track Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity.

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Manufacturers of the
Adjustable Steel
DRILL CHUCK,
Interchangeable Bolt & Nut Threading Machine, Nut Tapping Machines,
And all other kinds of Bolt and Nut Machinery.
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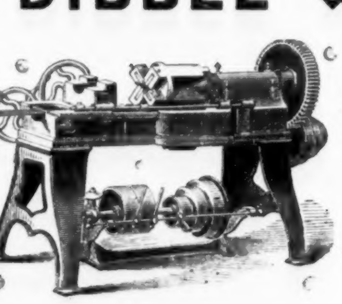
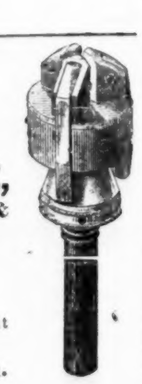

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ALSO JAPANNED AND BRIGHT BRASS
BIRD CAGES.
Water Coolers, Water Filters, Bathing Apparatus, Tea Trays, &c.
Send for Illustrated Catalogue.

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HARDWARE SPECIALTIES.

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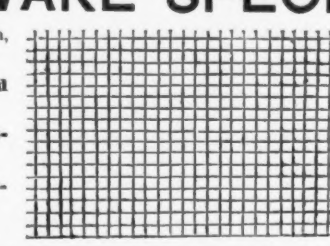

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Furniture Nails.
Bright Halter and Coil Chains.
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To buyers of Wire Cloth we give the assurance that our imported Screen Cloth is of best quality and finish—it excels in beauty and durability of color. We keep plain, green, gray, black, fancy patterns and landscape in stock, and all orders for ordinary widths from 24 to 48 inches will be promptly executed. Prices guaranteed satisfactory.

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"BEAVER" (American,) FILES AND HORSE RASPS. *"WIDE AWAKE"* AXES.

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Carriage, Tire, Machine, Stove, Plow & Agricultural Bolts,
COMMON AND PATENT WOOD CHOKER MOUSE TRAPS,
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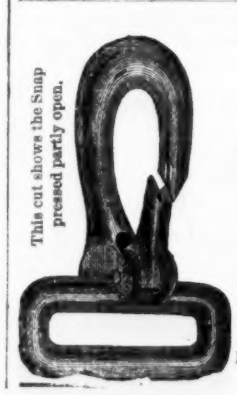
RIPLEY MFG. CO.'S Mouse Traps, Mallets, Base Knobs, Bung Starts, &c.

This cut shows the Snap pressed partly open.



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HENSHAW'S PATENT HARNESS SNAPS
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Plow, Fillettster & Dado Stops of all kinds, Set Screws for Plows, Bench Plane Starts, &c. Patent Washer Cutters. Plane Iron Screws to order of any size.
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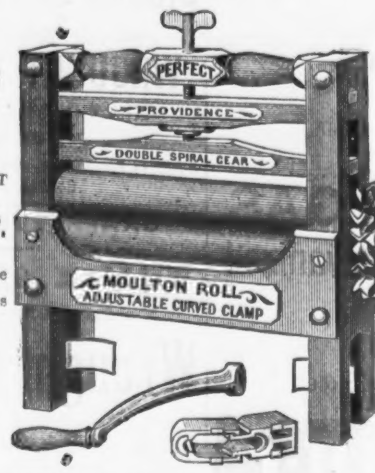
HINGE CLAMP. Covers more surface on all kinds of articles than any in market.



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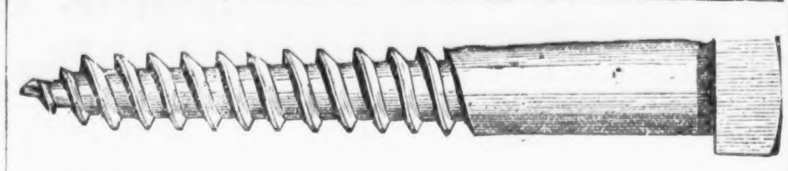

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all kinds of

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FORGED SET SCREWS AND TAP BOLTS.

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SUPERIOR BLACK LEAD CRUCIBLES

For Melting Steel, Brass and other Metals.

And Crucibles for Hardening Files.

Also any size or shape made for Chemical, Assaying and Refining Purposes.

Mr. R. Taylor is no longer connected with us in the Black Lead Crucible business. The Manufacturing Department will remain and continue under the supervision of the former experienced and skillful workman, Frederick Strow. Thankful for past favors, we would solicit a continuance of the same for the new firm.

STROW, WILE & CO.

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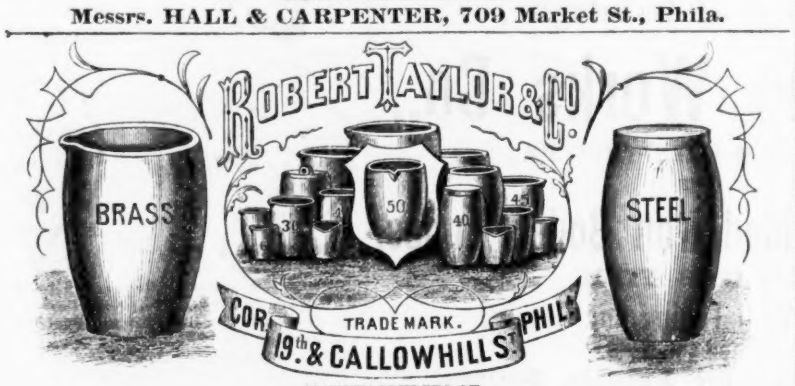

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Of all Sizes and Forms for melting

Steel, Brass, Gold, Nickel and all kinds of Metals.

Mr. Robert Taylor, who was for seven years the head of the late firm of Taylor, Strow & Co., and who is a practical mechanic, and familiar with all the details of the manufacture of Crucibles, attends personally to our manufacturing department. We would, therefore, respectfully solicit a continuance of the favors hitherto extended to him.

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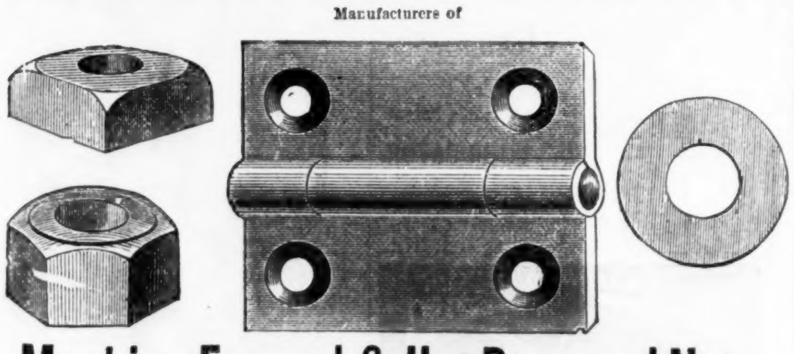

Machine Forged & Hot Pressed Nuts,

Washers, Bolts, Wrought Narrow Butts, Table and Trunk Hinges,

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We desire to call your attention to our **MACHINE FORGED NUTS.** They are made from extra quality of Iron, combining *lightness* and *strength*, and are especially well adapted for *Agricultural Machines* and *Carriage Work.*

Our **WASHERS** are made on improved machines—making them ***perfectly flat***, smooth and true, and are warranted superior to any in market.

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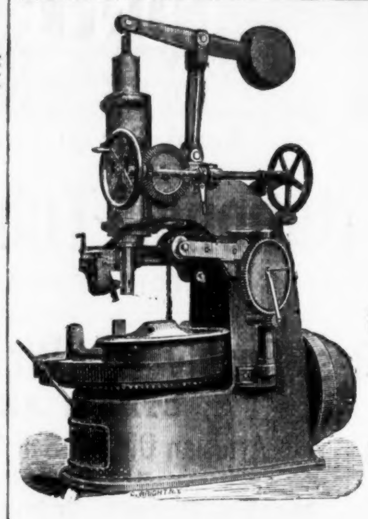

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MACHINISTS' TOOLS

OF ALL DESCRIPTIONS

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We make a specialty of manufacturing

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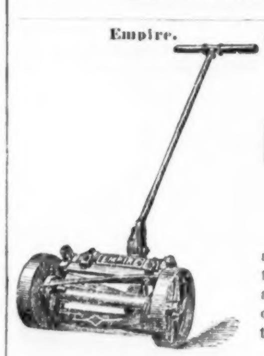

The Simplest, Strongest, Easiest Running

LAWN MOWERS

in the market.

Monitor.

All who need a Lawn Mower, either for a small or large Lawn, should examine the merits of Walker's Patents, **Empire** and **Monitor.** They are simple in construction and very light, not fatiguing the operator.

Send for *Circular.*

Price of Empire, (14 in. cut) **$20.** Agents wanted in every Town.

Price of Monitor, (No. 0, 10 in. cut) **$15;** No. 1, (14 in. cut) **$20.**

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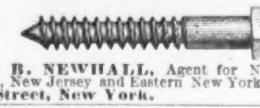
Manufacturing my own stock of iron, I am able to control quality, and fill orders promptly, with a very superior article, at the lowest possible price. Send for Price List.



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Jos. Scheider & Co.

Manufacturers of

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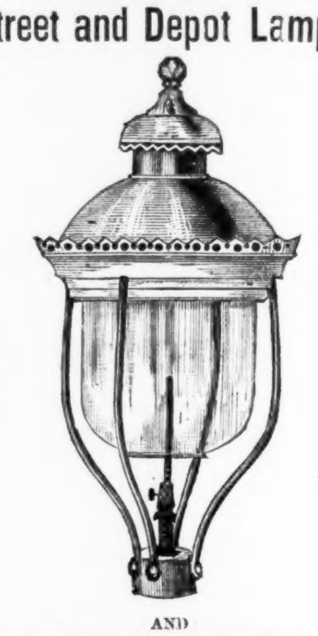
TIN WARE,

MINER'S PATENT

Street and Depot Lamps.



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CUSPADORES.

THE PATENT SELF-RIGHTING

CUSPADORE

Is superseding all others. Being made of **METAL** it will not break, and as the lower part is **CAST-IRON,** will not corrode as quickly as other articles composed of sheet-metal for the same purpose, and if upset, it rights itself immediately.

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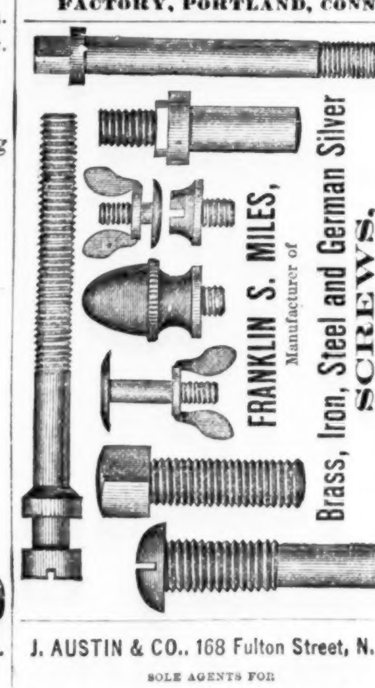

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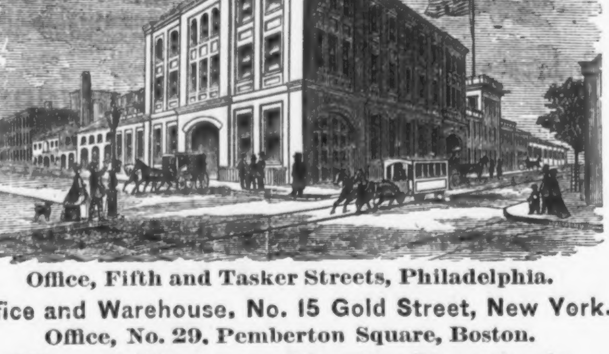

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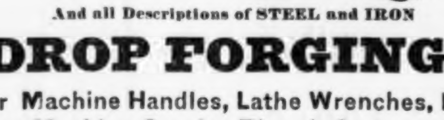

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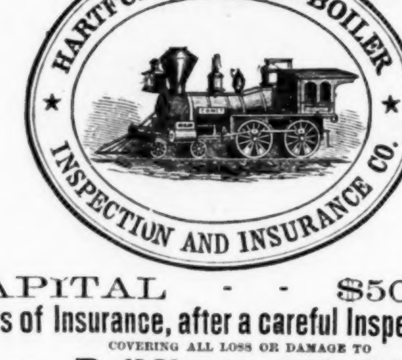

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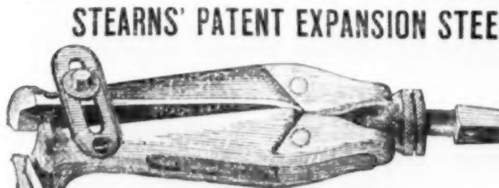

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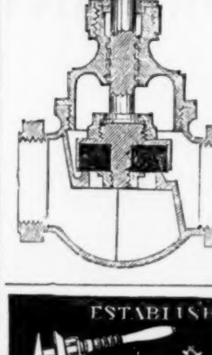

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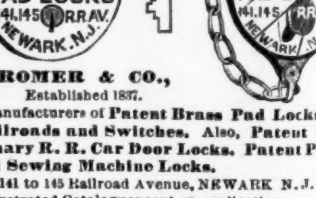

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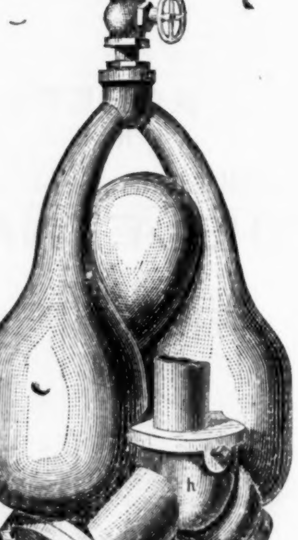

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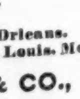
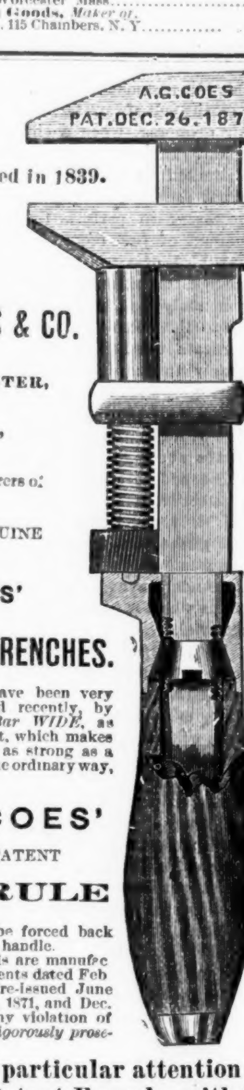


The Iron Age Directory

and Index to Advertisements.



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The Blair Process for the Manufacture of Iron and Steel.

From the paper read by Mr. Thos. S. Blair, before the American Institute of Mining Engineers, we make the following abstract:

When one considers that the immense results which flow from the successful achievement of the direct process are understood by all scientific men, and have been by them so understood for years past, it seems like presumption to attempt to carry off a prize which all have hitherto despaired of, or, seeking, have failed to win. It seems so plain, so easy, yet has still remained as it were, just out of reach.

There must be, one would say, some hidden but insuperable difficulty, else the problem had long since been solved. Consider for a moment how inviting a field it is. Nature provides us with the metal we want chemically combined with oxygen, and mechanically mingled with other substances. Let us withdraw this oxygen from the iron only, leaving the rest as compounds, it alone being elementary. Next, let us melt the product, so that the iron shall—simply by difference of gravity—be separated from the dross, and then poured into proper molds. Here we have but two steps, each of great apparent simplicity—first, reduction; second, fusion. Such is the ideal, which by contrast makes the old system appear so crude, unscientific, and roundabout, that the term "direct" applied to the new method sounds like the promise of a great and beneficent revolution.

We know that carbon at a certain low heat will dissociate the iron and the oxygen, yet leave the other mineral matter of the ore unreduced, giving metallic iron—wrought iron—as the result. We know, further, that we have at command furnaces in which the product can be melted down in a bath of cast iron, and so treated that it shall result in ingots of any desired degree of carburization. We know that if the reduction of the ore can be thus effected, the elements of cost in fuel, labor, &c., will make the product cheaper than pig iron, and also that the melting process is less costly than puddling, whereas its product is of far greater value. Why is it, then, that while the whole iron industry of the world is struggling by small economies to realize a return upon its capital, this most plain, most prominent of all economies remains unpracticed?

There has been a link missing—without it all naught. There has been no thorough, uniform, economical process of reduction. The missing link is true iron sponge. It is that which I came here to exhibit to-day; to tell you how it is obtained, and to show you that by the means I shall describe it is within the reach of all. * * * *

First, we investigate previous attempts, striving to detect what is defective, recognizing what is correct, and supplying what is yet wanting.

Proceeding in our course of elimination, we first reject all those methods in which it is sought to yoke the production of the iron sponge directly with a method of treating it; those, for example, which are meant to reduce the ore in one chamber and pass it as fast as reduced (or supposed to be reduced) into another chamber for after treatment—welding, melting, &c.

The operations cannot be made synchronous. One or the other must be disarranged in order to accommodate its fellow.

Confining ourselves, therefore, to the simple question of reduction, we finally give the preference, among the multitude of contrivances and appliances, to the vertical chamber, to be filled at top and drawn at bottom, and working continuously. But in all these we discover one fatal defect; there is no adequate provision for the isolation of the material, either while under treatment or while cooling, or both.

Mr. Blair here describes the reducing cylinders, or retorts, used by him. The ore (mixed mechanically with a small excess of carbonaceous matter over what is chemically necessary to effect its reduction to metallic iron) is charged in at the top of these cylinders, whose walls are heated externally by gas, but the flame from which never comes in contact with the materials inside of the cylinders. He says:

By this device, which surely is as simple as anything in metallurgical engineering, our dilemma is answered. We are now operating in regular practice, at Glenwood, cylinders of three feet internal diameter, and forty feet in hight, which are open tubes so far as relates to the taking in and discharging of their contents, but as relates to access of air in their working zones are sealed retorts; the seal above being the ingoing material itself and the gases percolating upward through it; and the seal below the material which, by cooling, has become indifferent to exposure. For the first time, then, in the history of attempts at the direct process, we have at our command complete isolation, yet continuous working.

Let us next take up the question of imparting and maintaining the necessary heat. Here at once another difficulty confronts us. We must work upon a scale of considerable magnitude, and our reducing chambers must, therefore, be of considerable area. But their contents are very poor conductors of heat, and a little experience will convince us of the impracticability of getting an evenly distributed temperature by conduction from the outside through a mass of, say, three feet diameter. Now we must have uniformity of temperature to get uniformity of result and the system we have adopted obliges us to impart the heat by conduction. We could conduct it, we will say, through three inches of the materials in time enough to answer all practical purposes, but not through three feet. * * *

In the top or mouth of the reducing cylinder is suspended an inner cylinder or thimble of cast iron, with walls say one inch thick, and having an outside diameter of twenty-eight inches.

Now the reducing cylinder has an inside diameter of thirty-six inches; hence there is left an open space or annulus between the two of four inches across.

I charge my materials into this annulus only, so that all have to pass downward through it, and none can be more distant than two inches from the heated surface, either of the cylinder or of the thimble. I make the thimble long enough—say six feet—to insure that all the materials shall have acquired the temperature desired before they descend below the annulus.

This "initial heating," as I call it, establishes one of the primary conditions with which we started out—the imparting of the necessary degree of heat—the only duty required of that portion of the heating chamber which surrounds the cylinders below the level of the bottom of the thimble, being to prevent the escape of the heat thus imparted. You will observe that this device completely meets the whole difficulty as to the conduction of the heat, so that—whatever the diameter of the reducing cylinder—it is only a question of what diameter and length you will give the thimble, in order to impart to your materials the temperature you wish. * * * *

Speaking of fuel, I would say that my method of heating the cylinders is to place the portion of them to be heated in a chamber of brick, which is supported on iron pillars, thus leaving the cooling zone accessible below. This chamber is heated by letting into it streams of gas at different levels, with an air inlet adjacent to each inlet of gas. All, of course, are arranged so as to have the gas supply under convenient control. Aside from the economy of gaseous, as compared with solid fuel, it is incomparably easier to keep a chamber such as this at a uniform temperature with gas than to heat it by burning coal or wood on grates. * * * * *

I secure perfect control of the heat of the thimble, and make sure that the material in the annulus will always be hot enough to be ready for dropping, when a charge is drawn from below. In this way the out-put of the furnace is limited to but one consideration, to wit: What duration of exposure to a red heat is necessary to perfect the conversion. The amount of fuel required for heating is about one-third of a ton to the ton of iron in the sponge turned out. Any description of fuel commonly used in gas producers will answer. As to the cooling, the reducing cylinders underneath the heating chamber are prolonged simply in wrought iron of one-fourth inch thickness, and each is surrounded by a jacket, which is kept full of water continually changed. The wrought iron cylinder ends about eighteen inches above the floor, and a sleeve, working telescope fashion, closes the remainder of the connection when let fully down. By raising this sleeve more or less, as required, the material gushes out underneath, and as it does so the whole column of material in the cylinder descends, leaving a space at the top of the annulus which is immediately filled up with fresh material. * * * * *

With respect to the carbonaceous matter used as the reducing agent, I would state that, in regular practice, we have, up to the present time, made use of charcoal. We have tried both coke and anthracite, but merely in an experimental way. We have not been prepared to remove the sulphur from either, and—having so many other things to get into working order—have preferred to run no risks in this particular. Our experiments have been conclusive, however, as to the reducing power of these substances, and we shall, early in the spring, take measures to use coke from washed coal. We have experimented with a Bradford separator, and find that the "slack" of the Pittsburgh coal can be so freed from the sulphur that even if none were driven off in coking, and the whole of it absorbed by the iron in the reducing cylinder, there would not be over 0·08 per cent. in the iron. For the country east of the Alleghenies the anthracite culm should furnish an exceedingly cheap reducing agent. I am informed there is no difficulty in removing the sulphur by treatment with steam charged with alkaline vapors, and at moderate cost. I have not yet had any practical experience, however, in this matter.

The estimate of the quantity required per ton of iron produced is very easily made. For brevity's sake, we will consider only the sesquioxides, as they require the largest ratio of carbon. They carry 70 per cent. of iron to 30 per cent. oxygen. Now, every 30 parts, by weight, of oxygen take up 22½ parts of carbon, so that we employ 22½ parts of carbon for every 70 parts of iron, or 32·14 parts of carbon to the 100 of iron. In round numbers, one-third ton of carbon to the ton of iron in the sponge. It may occur to you that this is the theoretical quantity, and that in practice it must require more. But such is not the case—at least, to an appreciable extent. No carbon is used in the reducing cylinder except what is taken up by the chemical operation referred to above. None of the other oxides of which the ore is composed are reduced, and there is no free oxygen present to consume any carbon. Whatever excess (beyond the amount absolutely required, we may mix in with the ore, to secure a sufficiency throughout the mass), is regained at the bottom of the cylinder.

I would now ask your attention to the fact that, in my statements respecting reduction, I have hitherto confined myself to the case of reduction by carbon only. You are aware, however, that there are certain substances, such as cyanogen, hydrogen, &c., which, when present with carbon, exert a singular power in accelerating its combination with iron. Some of these substances, as, for example, hydrogen, are also in themselves powerful reducing agents. You will see at once how the employment of these may vary results. The hydrocarbons, for example, will produce reduction at a lower temperature, or with great saving of time, but will yield an irregular carburized sponge. The field is too large to enter upon here, and must be passed over with this brief notice, to be reverted to, however, for a moment, when I come to speak of the second branch of the direct process, viz., fusion. * *

Our present practice at Glenwood is to take the iron sponge and press it, while cold, into blooms of six inches diameter and about 12 to 18 inches in length. A specimen of these is exhibited here. The pressing is performed by hydraulic machinery, and the force exerted is about 30,000 pounds to the square inch, or about 900,000 pounds on the bloom. Thus prepared we change them into an auxiliary heating furnace, where they are brought to a bright red heat, and then thrown into the bath of the melting furnace. We use no other form of wrought iron whatever. Otherwise there is nothing peculiar in our operations, and everything goes on just as if we were melting ordinary blooms, except that the fusion is much more rapid. We have no difficulty whatever with the lining of the furnace, owing to the small amount of protoxide left in the sponge, there being decidedly less than is usually found in puddle bar. It is here that the perfection of the reduction tells. * * * *

Dismissing these interesting topics I close my explanatory statements, trusting that nothing further is needed to satisfy you that you have now presented to you a perfectly practical and thoroughly direct process for obtaining the ingot of cast steel or homogeneous iron.

Little need be said as to the value of this product. Open hearth practice has already established the fact that steel fit for all purposes short of edge tools, can be produced (even when using the system of melting wrought into cast iron), and that the homogeneous metal is the type of all perfection in wrought iron. With respect to the results which will follow the introduction of the direct process into the field of iron metallurgy, I do not venture any prediction as to how speedy or how slow may be the revolution. Some time must elapse, during which the old system will regulate the market price, while the new system will—for those employing it—regulate the cost. But with such data as I will now very briefly call your attention to, it is easy to see that the old system must either be greatly cheapened or it must, sooner or later, be overgrown by the new.

The direct process demands so much smaller an amount of fuel that the proper plan for realizing the most profitable results in practicing it will be to go to the mines, and there produce the sponge at least; in many cases the ingot also. The extreme simplicity of the plans required, and the ease with which the process can be conducted on a small scale, if desirable, also point to the mines as the proper locality of the works, up to, as I say, the sponge always, the ingot often.

Take now such a locality where ore of 50 per cent. metallic iron is worth $4 per ton, and charcoal is worth six cents per bushel. We have:

Two tons ore at $4	$ 8·00
Forty bushels of charcoal at 6c	2·40
Gas producing fuel (wood) say	1·00
Wages, say	3·00
One ton iron in sponge	14·40

Let us add $5·60 per ton for transportion to a manufacturing center, making the cost of the sponge, say $20, delivered.

Add $2 per ton for cold pressing.

One ton of ingots will cost about as follows:

¾ ton cold pressed blooms, at $22	$16·50
15 per cent. waste on same	2·49
¼ ton Bessemer pig, at $45	11·25
7½ per cent. waste on same	84
Wages per ton	5·00
Maintenance of furnace, &c	2·50
Spiegeleisen, 1-20 ton, at $70 per ton	3·50
¾ ton fuel for producers, at $5 per ton	3·75
Cost of 2240 lbs. ingots of steel	$45·82

Assuming that we shall be able to substitute carburized sponge for the Bessemer pig, we reduce this to about $38·50.

The figures must be varied to suit every different locality, and in those where ore is a high-priced commodity and fuel cheap, there will not be as great a difference in favor of the direct process as where those conditions are reversed; but there will always be enough to give it an advantage that must tell eventually.

Finally, there is one aspect at least of this branch of the subject that must be gratifying to all. I refer to the humanitarian view. The word "puddling" finds no place in the direct process. No such exhausting, overtaxing labor is demanded in any of its operations, and as it is the truly scientific method of iron metallurgy, so does it, in common with all true science, point to the ultimate reconcilement of capital and labor.

I desire, before closing, to take this opportunity to acknowledge my indebtedness to my associate and co-laborer, Mr. Morrison Foster, of Pittsburgh, whose assistance from the first inception of my experiments up to the present time has been of the greatest value to me.

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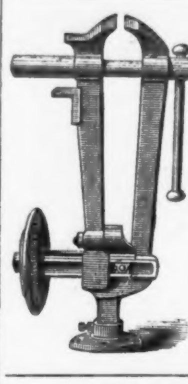
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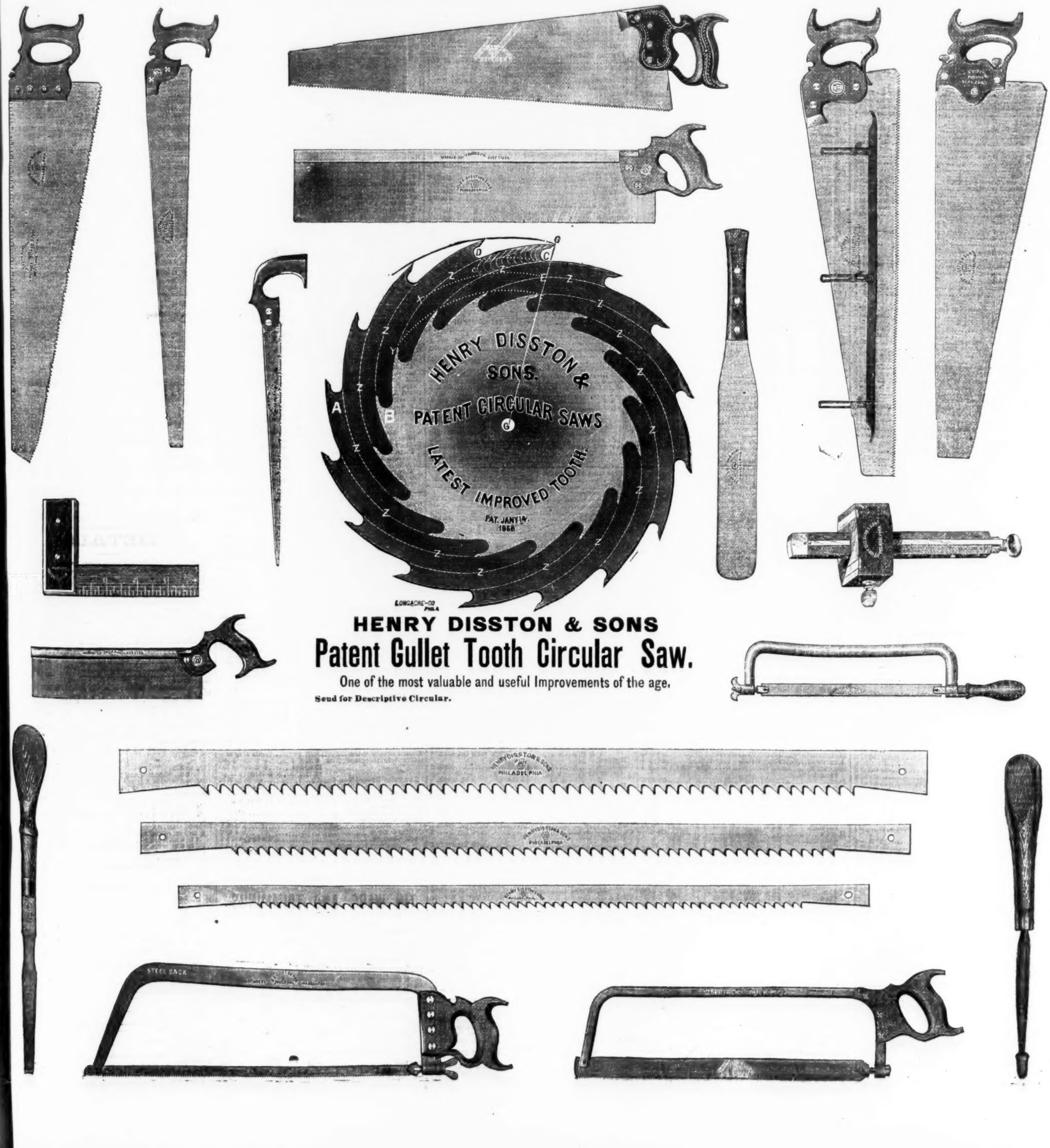

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℘ ℔ .... [illegible]
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Japanned .... 8 00 9 75 10 50 12 00 13 50 per doz
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Claw 7 50 8 00 8 50
Lathing 7 50 8 00 8 50
Shingling, Nos. 0 1 2 3 .... ℘ doz $7 50 8 00 8 50 9 00
Lathing, " 7 00 7 50 8 00 8 50
Broad, " 4 5 6 .... ℘ doz [illegible]
" " 4 5 6 .... [illegible]
Elephant ....
Shingling, Nos. 1 2 3 .... ℘ doz $8 00 8 50 9 00
Claw 9 00 9 50 10 00
Lathing 8 00 8 50 9 00
J. P. Verree & Co. .... dis 10 %
Shingling, Nos. 1 2 3 .... ℘ doz $7 00 7 50 8 00
Claw 8 00 8 50 9 00
Lathing 7 00 7 50 8 00
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Shingling, Nos. 1 2 3 .... 7 25 7 75 8 25
Claw 8 00 8 50 9 00
Lathing .... 7 25 [illegible]

Hinges.
Wrought Strap and T .... dis 25&7½ %
Providence Plate .... 6 and 8 in. list 11c; over 8 in. list 9½c .... dis 10 %
Screw Hook and Strap .... {6, 8, 12 in. 8½c; 14 in. & up, 8c} .... dis 10 %
Heavy Welded Hook .... {6 to 12 in. [illegible]; 14 in. & up, 8½c} .... dis 10 %
Screw Hook and Eye .... {⅝ to 1 in. 9½c; ¾ in. 10½c; ½ in. 12c} .... net

Hoes.
Solid Shank, C. S. .... ℘ doz $8 00—dis 20 @ 30 %
Socket .... ℘ doz 8 00—dis 20 @ 30 %
Riveted Eye .... ℘ doz 5 00—dis 20 @ 30 %
Grub .... dis 10 %
Planters'—Winsted .... add 10 %
Scovill .... add 33⅓ %
Scovill Pattern (Winsted) .... add 20 %

Hooks.
Bell .... dis 50 %
Bench—Hotchkiss' $5 00 ℘ doz .... dis 10 %
Bench—Weston's No. 1, $6 50; No. 2, $7 00 per doz net
" —McGill's .... $5 00 per doz, dis 10 %
Wardrobe, Japanned .... new list dis 55&5 %
Hat and Coat .... new list dis 55&5 %
Wrought Staples and Hooks and Staples .... dis 60&10 %
Screw Hooks and Eyes, revised list .... dis 70 %

Horse Nails.
Putnam's.
No. 5 6 7 8 9 10
33c 28c 26c 25c 24c 23c
In lots 2000 lbs. dis 5 %.
Ausable.
No. 5 6 7 8 9 10
31c 28c 26c 25c 24c 22c
Pointed & finished.
In lots of 1000 lbs. 5 % discount.
Hammered.
No. 5 6 7 8 9 10
28c 26c 24c 23c 22c 21c
In lots of 500 lbs. dis 5 %.
American Pressed.
No. 5 6 7 8 9 10
23c 20c 20c 20c 20c 20c
In lots of 1300 lbs. dis 5 %.
Perkins Finished (ready to drive).
No. 5 6 7 8 9 10
30c 26c 25c 25c 24c 28c
In lots of 1000 lbs. dis 5 %.
Bulls' Forged.
No. 5 6 7 8 9 10
28c 26c 26c 25c 24c 23c
Globe (Pointed and Polished).
No. 5 6 7 8 9 10
31c 28c 26c 25c 24c 23c
In lots of 1000 lbs. 5 % discount.
National (Pointed and Polished), Extra Finish.
No. 5 6 7 8 9 10
30c 27c 26c 25c 24c 22c
In lots of 1000 lbs. dis 5 %.
Vulcan (Blued, pointed, ready to drive).
No. 5 6 7 8 9 10
33c 30c 28c 27c 26c 25c
In lots of 500 lbs., 5 % discount.
1000 lbs. 7½ % discount.
New London Horse Nails.
No. 6 7 8 9 10
Great Western 23c 25c 24c 23c 22c
" 26c 25c 26c 25c 24c
In lots of 1000 lbs., dis 5 %.
Star Brand .... ℘ ℔ 16c
Morgan 14c

Horse Shoes.
Burden .... ℘ keg, $5 87½
H. I. Horse Shoe Co., Perkins Pattern .... ℘ keg, 5 87½
" " R. I. Pattern .... ℘ keg, 6 37½
Mule Shoes .... ℘ keg, 6 87½

Kettles.
Brass .... ℘ ℔ 55c net
.... ℘ ℔ 50c net

Knives.
Ames' Butcher Knives .... dis 20 %
" Shoe .... dis 15 %
Hay and Straw, "Wadsworth's" .... dis 20 %

Knobs.
Base—Common .... net
" Flush Tip .... dis 50&10 %
" Elastic End .... reduced list dis 10&10 %

Ladles.
Melting .... dis 20 %

Lanterns.
Brand's Patent .... dis 10 %
Ætna .... dis 10 %
Yankee .... dis 10 %
De Beque .... dis 10 %

Locks and Latches.
Cabinet—Eagle .... dis 25 %
Cabinet—Gaylord .... dis 25 %
Corbin .... dis 15 %
Continental .... dis 15 %
Shepardson's .... dis 20 %
Trenton Lock Co. }
Branford }
Norwich }
Russell & Erwin } New list dis 45 %. 2 % extra for cash.
Norwalk }
Nashua }
Mallory, Wheeler & Co. }

Mallets.
Hickory and Lignumvitæ .... dis 10&10 %

Meat Cutters.
Dixon's (P. S. & W.) .... dis 10 %
No. 1 2 3 4
℘ doz $14 00 $17 00 $19 00 $30 00
Hales' .... dis 25 %
No. 11 12 13
℘ doz $27 00 $33 00 $42 00
Miles Challenge .... dis 20 %
No. 1 2 3
℘ doz $22 00 $30 00 $40 00
Perry's Champion (P. S. & W.) .... dis 10 %
No. 200 300 400
℘ doz $22 00 $27 00 $40 00
Woodruff's (P. S. & W.) .... dis 10 %
No. 100 150
.... $18 00
American .... dis 5&5 %
No. 1 2 2½ 3 4 5
Each $6 00 $9 00 $14 00 $15 00 $30 00 $75 00

Molasses Gates.
Stebbins' Pattern .... dis 60&10 %
Tinned ends .... dis 40&10 %
Patent Self-Measuring .... per doz $42 00—dis 10 %

Mouse Traps.
Wood Choker .... ℘ doz holes, 16 @ 18c

Nails.—See Trade Report.

Nuts and Washers.
Nuts .... large, 5½c; small, 7½c off list.
Washers .... large, 1c; small, 2c off list.

Oil Stones.
Washita Nos. 1 .... ℘ ℔ 22c
" Slips .... ℘ ℔ 44c
Hindostan .... ℘ ℔ 6c dis 10&10 %
" Slips .... ℘ ℔ 10c dis 10&10 %

Oilers.
Olmsted's .... new list dis 25&10 %
Broughton's .... dis 40&5 %
Malleable .... per doz $5 00 net
Common Tin .... dis 30 %
" Zinc .... dis 30 %
" Brass and Copper .... dis 30 %

Picks.
Washoe R. R. .... dis 25 % .. Nos. 1 2 3 4 5
.... $14 00 15 00 16 00 17 00 18 00
Washoe Coal, dis 20 % .... gold, net

Picture Nails and Knobs.
Richard's Patent .... dis 40 @ 40&10 %

Pinking Irons.
.... dis 10 %

Planes.
Chapin's, 1st quality .... dis 30 %
Sandusky Tool Co., 1st quality .... dis 30 %
" 2d " (Ogontz) .... dis 40 %
Ohio Tool Co., 1st quality .... dis 30 %
" 2d quality (Scioto) .... dis 40 %
Owasco Tool Co., 1st quality .... dis 30 %
" 2d quality .... dis 40 %
Howland's, 1st quality .... dis 30 %
Bailey's Patent .... dis 20 %
Plane Irons, Butcher's .... $5 50 to £ gold—new list
" Chapin's .... dis 10 %
" Ohio Tool Co. .... dis 10 %
" Spear & Jackson's .... 5 50 to £ gold—new list
" Sandusky Tool Co. .... dis 10 %

Plumbs and Levels.
Chapin's .... dis 60&10 %
Standard Rule Co.'s New Adjustable .... dis 30&10 %
Stanley Rule and Level Co. .... dis 30&10 %

Pumps.
Douglas Cistern, etc. .... new list dis 25 %
" Rotary .... new list dis 25 %

Rakes.
Cast Steel .... dis 20 %
$8 00 9 00 10 00 11 00
10 12 14 teeth.

Razor Straps.
Genuine Emerson .... dis 35 %
" " in 5 gross lots .... dis 40 %
Hunt's .... dis 55 %

Rivets.
Iron and Tinned .... dis 40 %
Copper Rivets and Burrs .... dis 40 %

Rods.
Stair .... new list dis 10 %
American Patent .... dis 20 %

Rope.
Manufacturers' List.
Manilla .... ½ inch and larger .... ℘ ℔ 16½c
" ⅜ inch .... ℘ ℔ 17 c
" ¼ and 5-16 inch .... ℘ ℔ 18 c
Lath Yarn .... ℘ ℔ 17 c
Hay Rope .... ℘ ℔ 16 c
Sisal .... ½ inch and larger .... ℘ ℔ 11 c
" ⅜ inch .... ℘ ℔ 12 c
" ¼ and 5-16 inch .... ℘ ℔ 13 c
Hay Rope .... ℘ ℔ c

Rules.
Chapin's Boxwood .... dis 30&10 %
" Ivory .... dis 30&10 %
Hubbard & Curtiss Mfg. Co. .... dis 30&10 %
Chapman .... dis 30&10 %
Stanley Rule and Level Co.'s Ivory .... dis 30&10 %
Standard Rule Co.'s Boxwood .... dis 30&10 %
" " Ivory .... dis 30&10 %

Sad Irons.
Sad Iron, Nickel Stand attached .... ℘ ℔ 4½c net

Sand Paper—dis 7½ @ 10 %
Beader & Adamson's (Flint) 00 to 1½ .... ℘ ream $4 25
" 2, 2½ & 3 .... 4 50
Assorted 4 50
Emery .... ℘ ream $8 00
Star ....
Cowdin Mfg. Co. .... dis 10 %
Diamond Flint, 00 to 1½ 4 00
" 2, 2½, 3 and assorted 4 50
" Emery Paper .... per ream $6 50

Sash Locks.
Clark's .... dis 20 %
Ferguson's .... dis 20 %
Barwick .... dis 15 %

Sash Weights.
Solid Eyes .... ℘ ℔ 2½c

Sausage Fillers.
Perry's (P. S. & W.) .... dis 10 %
No. 1 0
℘ doz $15 00 $21 00

Saw Rods.
.... dis 10 %

Saws.
Spear & Jackson's .... $4 50 to £ gold
John Spear .... $3 60 to £ gold
Am. Saw Co. .... new list
Perforated Cross Cuts, all kinds .... 65c ℘ foot
Inserted Tooth .... dis 10 %
All else .... dis 12½ %
Disston's Circular .... dis 20 %
" Mill .... dis 25 %
" Cross Cut .... dis 15 %
" other kinds .... dis 12½ %
Livingston's Framed Wood .... dis 5 %
H. W. Peace's Circulars .... dis 10 %
Other kinds .... dis 10 %
Wm. McNiece's Hand, Cross Cut and Circular .... new list dis 10 %
E. M. Boynton's Lightning, dis 30&5 % for immediate cash
" " Others .... dis 15 %

Saw Sets.
Nash's .... dis 15&10 %
Bemis' .... dis 10 %
Aiken's Genuine .... dis 23 %
Hotchkiss' .... dis 10 %
Common Lever .... per doz $1 80 net

Scales.
Turnbull's .... dis 15 %
Brown's .... dis 25&5 %
Fairbanks' .... new list dis 15 @ 20 %
Howe's .... dis 15&5 %
Shattuck's Counter and Union .... dis 15 %
National Platform .... dis 25 %
Eureka .... dis 25 %
Scale Beams .... dis 25 %
No. 1 300 to 1200 lbs. .... 90c ℘ cwt
No. 2 " " .... 75c ℘ cwt

Screws.
American list of Jan. 1, 1874.
Flat Head Iron .... dis 52½ %
Round Head Iron .... dis 50 %
Flat Head Brass .... dis 52½ %
Round Head Brass .... dis 50 %
Round Head Silver Capped .... dis 25&10 %
Hand Rail .... dis 10 %
Coach or Lag .... dis 30&10 %
Coach, Patent Gimlet Point .... dis 5 %
Bed .... list net
English—Nettlefold & Chamberlain's Flat Head Iron .... dis 52½&10 %
Machine—Flat Head, Iron .... dis 60 %
" " Brass .... dis 10 %
Round Head, Iron .... dis 55 %
" Brass .... net
Bench—Iron, Wilson's .... dis 20 %
" —Wood .... dis 15 %
Hand .... dis 25&10 %
Jack—Bell Bottom .... dis 15 %

Scythes.
Blood's German Steel, Grass .... ℘ doz $9 00
" Cast " " .... ℘ doz 10 00
" Silver " " .... ℘ doz 11 00
" German " Grain .... ℘ doz 13 00
" Cast " " .... ℘ doz 14 00
" Red Rover 12 00
" Young America 9 50
" Silver Clipper 12 63
Scythe Snaths .... dis 20 %

Shears.
Cast Steel .... dis 60&10 %
Conn. Cutlery Co., new brand .... dis 60 %
Rowe's .... dis 50&10 %

Shovels and Spades.
Ames .... new list dis 12½ %
Rowland ....
Old Colony .... new list dis 10&5 %
N. B. Sherman .... old list dis 7½ %

Shovels and Tongs.
Iron Head .... list net
Brass Head .... dis 5 %
Polished Steel .... new list dis 15 %

Slates.
Square Frames, Round Cornered, by case .... dis 60&10 %
Less than a case .... dis 50 @ 55 %
Oval Frames, by case .... dis 40 @ 40&10 %
Less than a case .... dis 30 %

Spoons.
Iron .... new advanced list, dis 10 %
By the case .... dis 20 %
Britannia .... dis 40 @ 40&10 %
Plated A 1 .... revised list dis 30&5 %
German Silver .... revised list dis 10&10 %
Tinned (P. S. & W.)—
Teas .... $1 50 ℘ gross, net
Tables .... 2 75 " net

Stocks and Dies.
.... dis 15 %

Stove Polish.
Gem .... ℘ gross $5 00, dis 10 %
Joseph Dixon's .... ℘ gross, 6 00
National .... ℘ gross $4 75
Gold Medal .... ℘ gross $6 00, dis 15 %

Squares.
Steel .... dis 50 %; full cases, dis 50&10 %
Iron .... dis 50 %; full cases, dis 50&10 %
Nickel Plated .... add $2 50 @ $4 00 ℘ doz net
Try Squares and T Bevels .... dis 45&10 %
Star Try Squares and Bevels .... dis 30 %

Tacks.
Full Weight American Iron .... dis 40&7½ %
Half Weight American Iron .... dis 70&7½ %
Carpet .... dis 7½ %
Brads American Half Weight .... dis 50&7½ %
Finishing Nails .... ⅜ ⅝ ¾ 1 1¼ in. and over
℘ ℔ .... 25c 20c 18c 14c 13c dis 7½ %
Trunk and Clout .... ⅜ ⅝ ¾ 1 1¼ in. and over
℘ ℔ .... 25c 20c 18c 14c 13c dis 7½ %
Copper Tacks .... ℘ ℔ 50c—dis 7½ %
Iron Shoe Nails, ℘ ℔ 4-8 and longer, 10c; 3½-8, 10½c .... dis 7½ %
Double Pointed .... new list dis 33⅓ %

Tapes, Measuring.
American Flask and Cap Co. .... dis 20 %
Eddy's .... dis 20 %

Thermometers.
Tin Case .... dis 50 %

Toe Calks.
.... ℘ ℔ 13c net

Tobacco Cutters.
Champion .... dis 20&10 %
Peck, Stow & Wilcox .... dis 10 %

Tinners' Tools and Machines.
P. S. & W. .... list net

Traps.
Newhouse .... dis 20 %
Hotchkiss .... dis 20&10 %
Peck, Stow & Wilcox .... dis 30 %
Blake's Patent .... dis 15 @ 20 %

Trowels.
Lothrop's Brick and Plastering .... dis 10 %
Disston's " " .... dis 12½ %
Brades' " " .... gold, net
Worrall's " " .... dis 15 %
Garden .... dis 20 %

Vises.
Trenton Vises, Solid Box.
30 to 160 lbs. 16c
160 and over 13c
Peter Wright's .... ℘ ℔ 15½c. gold
Wilson's Solid Box .... dis 15 %
30 to 160 lbs. 18c
160 and upward 22c
Wilson's Parallel .... dis 30 %
Backus & Union, Parallel .... dis 25 %
Buffalo, Parallel .... new list dis 20 %
Fisher & Norris' Double Screw Parallel .... dis 15 @ 15&5 %
Trenton Parallel .... dis 15 %
Bonney's Saw Filers .... dis 20 %

Wire.
Bright and Annealed .... Nos. 0 @ 18 dis 35 @ 40 %
" " .... " 19 @ 26 dis 45 @ 50 %
" " .... " 27 @ 36 dis 50 @ 55 %
Coppered .... " 0 @ 18 dis 25 @ 30 %
Galvanized, Nos. 9 to 12 .... dis 40 @ 45 %
Galvanized, Nos. 13 to 18 .... dis 45 @ 50 %
Tinned .... dis 20 @ 25 %
Cast Steel .... 5 @ 10 %
Tinned Broom Wire .... dis 25 @ 30 %
Galvanized Telegraph, Nos. 8 and 9 .... ℘ ℔ 10c @ 11c
" " " 10 and 11 .... ℘ ℔ 11c @ 12c
" " " 12 .... ℘ ℔ 11½c @ 12½c
Annealed Fence, Nos. 8 and 9 .... dis 35 @ 40 %
" Grape, " 10 to 14 .... dis 35 @ 40 %
Fence Staples .... ℘ ℔ 8½ @ 9 %
Stubs' Steel Wire .... $7 00 to ℔ gold

Wrenches.
American Adjustable .... dis 45 %
Baxter's Adjustable "S" .... dis 20 %
" Diagonal .... dis 20 %
Collins & Co.'s .... dis 40 %
Coes' Genuine .... dis 40 @ 40&5 %
" Pattern (Wrought) .... dis 50 %
" " (Malleable) .... dis 60&10 %
Lindsay's Patent .... dis 25 %
Taft's Pattern .... dis 70 %
Davis' Patent Duplex .... new list dis 25 %
Bemis & Call's Patent Combination .... dis 20&5 %

TIN WARE AND TRIMMINGS.

STAMPED TIN WARE.

Basins.
Wash Basins, Handled, Plain Stamped .... dis 25 %
Inch 10 11 11¾
Per doz $3 50 4 00 4 50
Wash Basins, Handled, Retinned .... dis 25 %
Inch 10 11 11¾
Per doz $4 00 4 50 5 00
Wash Basins, with Feet, Plain Stamped .... dis 25 %
Inch 10 11 11¾ 13¾
Per doz $2 00 2 50 2 85 3 75
Wash Basins, with Feet, Retinned .... dis 25 %
Inch 10 11 11¾ 13¾
Per doz $3 00 3 50 4 00 5 00
Wash Basins, Stamped .... dis 25 %
Inch 10 10½ 11¾
Per doz $1 70 2 10 2 50
Inch Shallow 10 11
Per doz $1 55 1 90
Wash Basins, Retinned .... dis 25 %
Inch 10 10½ 11¾
Per doz $2 50 3 00 3 50
Inch Shallow 10 11
Per doz $2 00 2 00

Covers.
Bucket .... dis 10 %
1 pt. 1 qt. 2 3 4 6 8 10 12 qt.
Per gross $2 25 3 00 4 00 4 50 5 75 7 75 8 75 9 25 13 00
Coffee Pot .... dis 10 %
3 pt. 2 qt. 3 4 6 qt.
Per gross $1 25 1 50 1 75 2 25 3 50
Pot .... dis 10 %
Inch 7½ 7¾ 8½ 8¾ 9½ 9¾ 10½
Per gross $5 50 6 00 6 75 7 25 8 00 8 50 10 25
Inch 10½ 11½ 11¾ 12½ 13¾
Per gross $11 00 11 75 12 50 15 50 19 00
Tea Kettle Breasts and Covers .... dis 10 %
Inch 6½ 6¾ 7½ 8 8½ 9
Per gross $6 00 6 50 8 00 9 00 9 75 10 50
Inch 9½ 10 10½ 11 11½ 12½ 13¾
Per gross $11 25 13 00 14 00 15 00 16 00 21 00 24 00
Dipper Bowls, Plain Stamped .... dis 25 %
Pints .... ½ ¾ 1 1½ Quarts 1 2 2½
Per doz. .50 .60 .70 .80 Per doz .... .90 1 25 1 50
Dipper Bowls, Retinned .... dis 25 %
Pints .... ½ ¾ 1 1½ Quarts 1 2 2½
Per doz. .75 .95 1 00 1 15 Per doz 1 30 1 55 1 80

Pans.
Dish Pans, Tinned .... dis 25 %
Quarts 7 8 10 14 17 21 30
Per doz 8 50 9 50 11 00 13 00 16 00 19 00 31 00
Milk Pans, Plain Stamped .... dis 25 %
Quarts .... ½ 1 1½ 2 3 4 5 6 8 10
Per doz .... $ .85 1 05 1 20 1 45 1 65 2 40 2 90 3 15 4 40 5 00
Milk Pans, Retinned .... dis 25 %
Quarts .... ½ 1 1½ 2 3 4 5 6 8 10
Per doz $1 15 1 40 1 60 1 90 2 15 3 00 3 40 3 80 5 20 6 00
Pie Plates .... dis 10 %
Inch 6 7 8 9 10 11
Per gross $4 50 5 00 7 25 7 75 10 50 12 00

JAPANNED TIN WARE.

Cannisters, Common .... dis 10 %
Pound .... ½ 1 2 3
Per doz $1 10 1 60 2 50 3 25
Cannisters, Hinged .... dis 10 %
Pound 1 2 3 4 6
Per doz $1 75 2 75 3 40 3 75 4 50
Candlesticks, Japanned .... dis 10 %
No. 1 2
Per gross $5 00 7 00
Cake Boxes, Round .... per nest, $3 25, dis 10 %
" Square .... per nest, 4 25, dis 10 %
Chamber Pails, Japanned (Smith, Burns & Co.) .... dis 10 %
Nos. 2 3 4 5
Green, per doz $8 00 9 00 10 50 12 50
Oak " $9 50 10 50 12 00 13 50
Dust Pans, Corrugated .... per gross, $22 00, dis 10 %
Box Graters .... per gross, $4 00, dis 10 %
Molasses Cups .... dis 10 %
Pint .... ½ 1 2
Per doz .... $1 25 .50 2 75
Pepper Boxes Japanned .... dis 10 %
Per gross .... Small, $3 00; Large, $4 00
Toy Banks, House .... dis 0 %
No. 1 2
Per gross $7 00 5 50
Toy Banks Gothic .... dis 10 %
No. 1
Per gross $5 50
Toy Cups, Straight .... dis 10 %
No. 1 2 3
Per gross $4 00 3 50 3 50
Toy Cups, Flaring, nests of (3) .... per gross, $2 50, dis 10 %
Toy Pails, Covered .... dis 10 %
No. 1
Per gross $4 50
Toy Rattles .... per gross, $2 25, dis 10 %
Trunks, Wire Handled .... per nest (5) $1 50, dis 10 %
Spittoons, Tin .... per gross, No. 2, $30, No. 3, $27, dis 10 %

PLANISHED TIN WARE.

Planished Coffee Pots, Round .... dis 25 @ 30 %
Each .... .60 .75 .85 .95 1 15 1 25 1 30 1 40
Pints 1 2 3 4 5 6 7 8
Planished Tea Pots, Round .... dis 25 @ 30 %
Each .... .70 .80 .95 1 05 1 25
Pints 2 3 4 5 6
Planished Tea Pots, Oval .... dis 25 @ 30 %
Each .... .70 .80 .90 1 05 1 15 1 40 1 75
Pints 1 2 3 4 5 6 8

Tea Pot Handles—P. S. & W. .... dis 20 %
Stow's Patent Hollow Tea Pot Handles.
No. 1, Small 4½ inches .... per gross, $11 50
No. 2, Medium, 5¾ " .... " 12 50
No. 3, Large, 6¾ " .... " 13 50
No. 4, Ex. Large, 7¼ in., for Wash Pitchers, &c. .... " 18 00
Stow's Patent. New Pattern.
No. 25, Small, 4½ inches .... per gross, $11 50
No. 35, Medium, 5¾ " .... " 12 00
No. 45, Large, 6¾ " .... " 13 00
Solid Iron, Tin Tipped.
No. 10, Small, 4½ inches .... per gross, $9 00
No. 15, Medium, 5¾ " .... " 9 50
No. 20, Large, 6¾ " .... " 10 75
Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W.
No. 12, Bronzed and Tin-Tipped .... per gross, $13 50
Saucepan Handles. Of Best Malleable Iron.
P. S. & W. .... dis 20 %
Japanned.
No. 1, 5½ inches long .... per gross, $3 50
No. 2, 6 " .... " 3 75
No. 3, 6½ " .... " 4 00
No. 4, 7½ " .... " 4 25
No. 5, 8 " .... " 4 50
No. 6, 9 " .... " 4 75
Tinned.
No. 1, 5½ inches long .... per gross, $4 25
No. 2, 6 " .... " 4 50
No. 3, 6½ " .... " 4 75
No. 4, 7¼ " .... " 5 25
No. 5, 8 " .... " 5 50
No. 6, 9 " .... " 5 75
Japanned .... per lb., .16
Tinned .... " .20
Iron Kettle Ears (P., S. & W.) .... dis 45 %
Half gross pairs in a package.
Tinned.
Nos. 1 2 3 4 5 6 7 8
Per gross pairs .. 88c $1 00 1 50 1 75 2 10 2 75 3 75 4 50
Black.
Nos. 1 2 3 4 5 6 7 8
Per gross pairs .. 75c 88c $1 35 1 50 1 75 2 25 2 75 4 00
Tinned Tea Kettle.
Nos. 4 5 6
Per gross pairs $1 75 2 10 2 75

METALS.

IRON.—DUTY: Bars, 1 to 1½ cents per lb.. Sheet, Band, Hoop and Scroll, 1½ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. All subject to a reduction of 10 per cent. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1½ cents per lb.

Pig Iron—AMERICAN.
Foundry No. 1 .... ℘ ton, $35 00 @ 36 00
Foundry No. 2 .... " 33 00 @ 34 00
Gray Forge .... " 29 00 @ 31 00
White and Mottled .... "
SCOTCH.
Gartsherrie .... "
Coltness .... 48 00 @ 44 00
Glengarnock .... 40 00 @ 41 00
Eglinton .... " 39 00 @ 40 00

Bar Iron.
Am. Refined, at mill .... ℘ ℔ 3·1c @ 3·3c

Rails.
Welsh, gold .... ℘ ton,
American, at works, currency .... " 59 00 @ 60 00
Old Rails, T, currency .... " 40 00 @ 41 00

Scrap.
Wrought Scrap, from yard .... " 42 50 @

Bar Iron from Store.
Common Iron.
¾ to 2 in. round and square .... ℘ ton, $ 70 00
⅝x9-16 in " " .... " 75 00
⅝ in. " " .... " 77 50
2¼ to 3 in. " .... " 75 00
1 to 6 in. wide x ⅜ and 1 in. thick .... " 70 00
1¼ to 6 in wide x ¼ & 5-16 in. thick .... " 75 00
1 and 1¼ in. x ¼ and 5-16 .... " 82 50
Swedish Iron
1½x¾ and ⅜ .... " 170 00
1¾ ⅜ to ⅝, and ¾ square .... " 165 00
1¾ to 5x¾ to ¾ and ⅜ to 2-in. square .... " 160 00
6 x 3x¾ and ⅜ .... " 170 00
Refined Iron.
¾ to 2 in. round and square .... " 72 50
1 to 6 in. wide x ⅜ to 1 thick .... " 72 50
1¼ to 6 in. wide x ¼ and 5-16 thick .... " 77 50
1 and 1¼ x ¼ and 5-16 .... " 77 50
Large Rounds.
2¼ to 2¾, round and square .... " 80 00
3, 3¼ and 3½ in. .... " 85 00
3¾ and 4 in. .... " 82 50
Rods—⅝ and 11-16, round and square .... " 77 50
½ and 9-16, " " .... " 80 00
7-16, " " .... " 85 00
⅜, " " .... " 90 00
5-16, " " .... " 95 00
¼, " " .... " 100 00
3-16, " " .... " 127 50
Band Iron.
1 to 6 in. x 3-16 to No. 12 .... " 82 50
Horse Shoe Iron.
⅝ and ¾ x ⅜, to ⅝ .... " } 107 50
1 x ⅜, to ⅝ .... " }
Ovals, Half Ovals and Half Rounds.
¾ to 1½ .... ℘ ton, $ 97 50
⅝ and 11-16 .... " 102 50
½ and 9-16 .... " 107 50
7-16 .... "
⅜ .... "
Nail Rods
Best Norway .... ℘ ℔ 8½ @ 9c
Norway Shapes
¾ to 2 in. x ¾ to ⅜ .... ℘ lb } 8½c
¾ to ¾ square .... }
Norway Bar
¾ to 2 in. square ....
Spring Steel
1 to 4 in. wide 7½c
Tire Steel
⅝ to 1½ x ¾ and 5-16 .... " 8½c
⅝ & 1 x 3-16 .... " } 9½c
⅝ & 1 x ⅜ .... " }

Toe Calk Steel
⅜ to ¾ x ⅜ to ½ ... " 7⅞c
Plow Steel
6 to 16 wide ... " 8⅝c
Sleigh Shoe Steel
⅝ to 1⅛ x ¾ to ⅝ ... 6⅝c
Hoops, ⅜ x No. 22 ... ₩ ton $155 00
" ⅝ x No. 20 ... 130 00
" ¾ x No. 19 ... 125 00
" 1 and 1⅛ x No. 18 ... 115 00
" 1¼ to 2 and 1x1¼ x No. 13 and 14 ... 105 00
Scroll Iron—⅜ x 12 ... 132 50
" ⅜ x 10 ... 122 50
" ⅜ x 3-16 ... 127 50
" ⅝ x 12 ... 122 50
" ⅝ x 10 ... 132 50
" ⅝ x 12 ... 120 00
" ⅝ x 11 ... 117 50
" ¾ x 3-16 ... 115 00
" ¾ x 10 ... 112 50
" ¾ x 12 ... 115 00
" ¾ x 10 ... 112 50
" ¾ x 3-16 ... 110 00
" ⅞ x 12 ... 107 50
" ⅞ x 10 ... 110 00
" 1 x 12 ... 107 50
" 1 x 10 ... 105 00
" 1 x 12 ... 102 50
" 1 x 11 ... 120 00

Sheet Iron.

	Common English.	R. G. American.	R. G. English.
Nos. 10 to 20 ... ₩ ℔	4½ @ 4⅝c	5⅛c	6c
21 to 24 ...	"	5⅜c	6⅛c
25 to 26 ...	"	5⅝c	6⅜c
27 ...	"	6c	7c
28 ...	"	6⅜c	7⅜c

Galvanized, 10 to 20, prime ... ₩ ℔ 11c
" 21 to 24 ... " 12c
" 25 to 26 ... " 14c
" 27 ... " 14c
" 28 ... " 15c
Patent Polished ... " 15c
Russia, Nos. 8 to 14 ... ₩ ℔ 19c
" Nos. 12 to 16 ... " 19c
" Stained, No. 1 ... " 17½c
Belgian ...
One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON

4	4½	5	5½	6	7 inch.
$3·75	4·25	5·25	5·25	6·50 per doz.	

RUSSIA IRON.

4	5	5½	6	7 inch.
$9·00	10·00	13·00	13·00	14·00 per doz.

Adjustable Stove Pipe Elbows.

CHARCOAL IRON.

4	4½	5	5½	6	7 inch.
$3·25	3·75	4·25	4·75	5·25	6·25 per doz.

RUSSIA IRON.

4	4½	5	5½	6	7 inch.
$7·00	8·00	9·50	10·25	11·25	13·75 per doz.

Discount on orders of 10 doz. 5 %.
" " 25 doz. 10 %.

Brass.

ROLLED AND IN SHEETS.
(Brown & Sharp's Gauge.*)
For the purchase of 100 pounds and over at one time

HIGH BRASS.

All Nos. to No. 28, and widths 14 in. and under ... 34c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in. inclusive ... 37c
Over 20 in. to 30 in. inclusive ... 40c
¾c ₩ ℔ advance on each No. above No. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass at ... 58c
Sheets 24x48 in., and all sheets cut to particular sizes and lengths ... 40c
Platers' Bars ... 44c
Sheets wider than 30 in. and under 40 in ... 44c
" 40 in. and over ... 46c
Circular sheets, in diam. from 4 in. to 14 inclusive ... 44c
" " over 14 in. to 20 ... 47c
" " " 20 in. to 30 ... 50c
" " " 30 in. to 40 ... 53c
" " " 40 in ... 56c
Brass Rods above No. 0, and under 1 in ... 43c
" 1 in. and over ... 47c

LOW BRASS.

4c ₩ ℔ more than High Brass.
Gilding Metals, 7c ₩ ℔ more than High Brass.
Platers' or Gold Metal { in Bars ... 46c
{ Sawed ... 49c

FOR SLITTING: Metal in Width.
2 in. to ⅜ in., to No. 30, inclusive, 1c ₩ ℔ advance.
2 in. to ⅜ in., thinner than No. 30, 2c ₩ ℔ advance.
2 in. to ⅜ in. " " 30, 3c " "
⅜ in. and less to No. 30, 2c ₩ ℔ advance.
⅜ in. and less thinner than No. 30, 5c ₩ ℔ advance.
10 % discount.

SCRAP—NEW METAL.

High Brass Scrap, 17 cents, net.
Low " 19 " "
Gilding, 21 cents, net.
Turnings, Filings and Chips, half the price of Scrap net.

BRASS AND COPPER WIRE.
(Stub's Wire Gauge.)

	High Brass.	Low Brass.	Gild'g and Cop'r
Nos. 0 to 20 ...	37	41	47
Nos. 21, 22, 23 ...	38	42	48
Nos. 24 and 25 ...	39	43	49

Brass Wire straightened and cut, 4 cents advance
10 % discount

FINE WIRE—NET PRICES.

	High Brass.	Low Brass.	Gild'g and Cop'r
No. 26 ...	0·41	0·45	0·51
No. 27 ...	0·44	0·48	0·54
No. 28 ...	0·46	0·50	0·56
No. 29 ...	0·48	0·52	0·58
No. 30 ...	0·52	0·56	0·62
No. 31 ...	0·52	0·56	0·66
No. 32 ...	0·56	0·60	0·71
No. 33 ...	0·60	0·64	0·81
No. 34 ...	0·69	0·73	0·91
No. 35 ...	0·78	0·82	1·03
No. 36 ...	0·94	0·98	1·13
No. 37 ...	1·08	1·08	1·28
No. 38 ...	1·28	1·28	1·58

Ten cents per pound extra for Spooling.

TUBING.
(Brown & Sharpe's Gauge.)

₩ ℔
Plain to No. 20, inclusive ... $0·32
Nos. 21, 22, 23, 2c. advance on List for each No.
Nos. 24, 25, 26, 4c. "
Above No. 26 special rates.
Plain Tube, 1-4 inch ... 48
" 3-16 " ... 1 38
" 1-8 " ... 1 75
All Mandrel-Drawn Tubes 5c. advance on List.
Fancy Tubing 4c. advance on List above Plain.
English, Scotch, and Extra Patterns Fancy Tubing to No. 20 ... 61
Tubing sawed or cut 2 to 4 ft. long, 2c. advance on List.
Add to two cents a half-cent for each additional cutting under two feet. 10 % discount.
Brass Door Rail—48 cents per lb.—10 % dis.

BELT AND HOSE COPPER RIVETS AND BURS.

Price per ℔ ... 59 52 54 56 58 60 64 68c
Nos ... 7 8 9 10 11 12 13 14 15
Braziers Rivets, 48 cents per pound discount 10 %.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire
4 per cent. 12 inch. to No. 26 ...	0·75	0·90
5 " ...	0·85	1·00
10 " ...	1·05	1·25
15 " ...	1·30	1·55
18 " ...	1·45	1·75
20 " ...	1·55	

Discount 10 %.
German Silver Sheet 10 over 12 inches wide and weighing more than 10 lbs ... $2 10 ₩ ℔ net
Advance two cents for each additional inch in width above 12 inches, and two cents per pound on each No. thinner than Nos. 26 to 36, inclusive.
All German Silver thinner than No. 36 is Platers' at 50 cents per pound additional.
German Silver Scrap, one-third less than net price of 12 inch Market Metal; German Silver Turnings, Filings and Chips, half the price of Scrap.
* Brown & Sharp's Gauge is about two numbers finer than Stubs' Wire Gauge.

COPPER.—DUTY: Pig, Bar and Ingot, 5c.; old copper, 4 cents ₩ ℔; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem. All subject to a reduction of 10 per cent.
American Ingot ... @ 26½c
English ...

SHEATHING, BRAZIERS COPPER, BOLTS, &C.

Braziers Copper, ordinary sizes, over 16 oz., per square foot ... 35c ₩ ℔
Braziers' Copper, ordinary sizes, 14 oz. and over 12 oz., per square foot ... 36c. "
Braziers Copper, 12 oz. and less per square foot and lighter 41c. "
Circles less than 84 inch in diameter ... 38c. ₩ ℔
Circles, 84 inch diameter and over ... 40c. "
Segment and Pattern Sheets ... 40c. "
Locomotive Fire Box Sheets ... 38c. "
Sheathing Copper, over 12 oz. sq. ft ... 35c. "
" " 12 oz. ₩ sq. ft. and lighter ... 41c. "
Bolt Copper ... 35c. "
No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

TINNING.

14x48, by the case ... 8c. ₩ sheet
14x48, less than case ... 10c. "
Boiler Sizes, 7 and 8 inch ... 12c. "
" 9 inch ... 15c. "
Other sizes not larger than 30x60 ... 2½c. ₩ sq.
Larger than 30x60 ... 3c. "
Copper Bottoms, 34 @ 36c. ₩ ℔ ... net

O'NEILL'S PATENT PLANISHED COPPER.
14x48.

14 and 16 oz. and heavier ... 39c. By the case, 38c. ₩ ℔
12 oz. and lighter ... 43c. " 42c. "

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in., 14x60
14 and 16 oz. and heavier ... 41c. By the case, 40c. ₩ ℔
12 oz. " ... 44c. " 43c.
(And all sizes not over 20 inches wide.)
30x60
14 and 16 oz. and heavier ... 45c. ₩ ℔
12 oz. " ... 48c. "

LEAD—DUTY: Pig, $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2½ cents per lb. All subject to a reduction of 10 per cent.
Spanish ... 6¾ @ 6⅞c gold
German Refined ... 6⅞ @ 6⅞c gold
English ... 7 @ 7⅛c gold
Bar ... dis 10 % ... 8½c.
Pipe ... dis 10 % ... 9c.
Tin Lined Pipe ... dis 10 % ... 18½c.
Sheet ... dis 10 % ... 9c.
Shot ... dis 10 % Drop, 9c ... Buck, 9½c.
Solder No. 1, 19c. @ 19c. No. 2, 17c. @ 17½c.

STEEL.—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb.; over 11, 3½ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. All subject to a reduction of 10 per cent. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as Steel.

American Cast Steel.

Tool ... 16c
Spring ... 12½c
Homogeneous ... 12½c
Tire ... 12½ @ 13½c
Machinery (round and square) ... 11½ @ 12c
File ... 12½c
Sheet ... 14 @ 16c
Saw Plate, mill and mulay ... 14 @ 16½c
Saw Plate, gang and X cut ... 13 @ 14c
" circular as to size ... 18 @ 30c

Chrome Steel.

Tool ... ₩ ℔ 20 @ 21c
Tool, extra fine ... " 40 @ 75c
Spring ... ₩ ℔ 12c and upward
Machinery ... ₩ ℔ 14c.
Hammer ... " 15c,
Gun or Homogeneous ... " 16c

English Steel.—payable in gold, dis 5 % cash.
" Best Cast ... ₩ ℔ 18c
" Extra Cast ... " 19c
" Round Machinery, Cast ... " 11½c
" Swaged, Cast ... " 18c
" Best Double Shear ... " 18c
" Blister, 1st quality ... " 13½c
" " 2d quality ... " 11½c
" " 3d quality ... " 10½c
German Steel, Best ... " 11½c
do 2d quality ... " 10½c
Sheet Cast Steel, 1st quality ... " 18c
" " 2d quality ... " 16c
" " 3d quality ... " 14c
File Steel, Flat and ½ Round ... " 12½c
" Square and Round ... " 13c
" Mill ... " 13½c
" Taper to 4 inch ... " 17c
" Taper 3 and 3½ inch ... " 18c

SPELTER.—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.—less 10 per cent.
Silesian, cash ... 7½ @ 7¾c., gold
American " ... .8 @ 11c., currency

TIN.—DUTY: Plates, Sheets, Tagger and Terne, 15 per cent. ad val.; Electro-galvanized Plates, 2 cents per ℔; Manufactures of, not enumerated, 35 per cent. ad val. —all subject to a reduction of 10 per cent. Bars, Blocs and Pigs, free. Banca, subject to duty of 10 per cent.
Banca ... ₩ ℔ 30c. gold
Straits ... ₩ ℔ 27c gold
English ... ₩ ℔ 24½c. gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal ... 12·25 @ 12·50
12x12, " ... 12·75 @ 13·00
14x20, " ... 13·00 @ 13·25
I X 10x14, " ... 14·50 @ 14·75
12x12, " ... 15·00 @ 15·25
14x20, " ... 15·50 @ 15·75
D C 12½x17 " ... 11·75 @ 12·00
D X 12½x17 " ... 14·00 @ 14·25
For each additional X add ... 2·25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary.
I C 10x14 ...	$11·75 @ 12·00	10·75 @ 11·00	9·75 @ 10·25
I C 12x12 ...	12·25	11·50	
I C 14x20 ...	12·50	11·50	

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20 ...	$11·00 @ 11·25	10·00 @ 10·75	7·50 @ 10·00
I X 14x20 ...	13·75		
I C 20x28 ...	24·00	21·50 @ 23·50	19·00 @ 21·50
I X 20x28 ...	28·50	27·50	
I C 20x200 ft.	25·00		

ZINC.—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet, 2½c. ₩ ℔. All subject to a reduction of 10 per cent.
Sheet ... cask 9½c
" ... open 10c

Paper Stock, Old Metals, &c.

(*Dealers' Selling Prices.*)

Canvas linen ... 6 @
" cotton, No. 1 ... @ 6
" " No. 2 ... @ 3½
White linen rags, No. 1 ... @ 7½
" " No. 2 ... @ 5½
Colored ... 2½ @
Mixed woolens ... @ 3
Soft woolens ... @ 6½
Gunny bagging ... 1¾ @ 2
Jute Butts ... 2½ @ 2¼
Kentucky bagging ... 5¼ @ 5½
Book stock ... 4 @ 4½
Waste paper and scraps ... 1¼ @ 3
Rope cuttings ... 1½ @ 3
Kentucky Bale rope ... 4 @ 4½
Oakum junk, No. 1 ... 5½ @ 5¾
" No. 2 ... 3½ @ 4
Grass rope ... 3¾ @ 4
Tarred Shaking ... 1¼ @ 1½
White Collar Cuttings, all paper ... 7 @ ..
" " " muslin lined ... 5 @ ..
" Envelope " ... 7 @ ..
Hard White Shavings, No. 1 ... 6½ @ ..
Soft " " No. 1 ... 6 @ ..
White Shavings, No. 2 ... 5½ @ 6
Mixed Shavings, part white ... 4 @ 4¾
Imperfections, No. 2, best folded sheets ... 5 @ ..
" " 1, Heavy Stock ... 4¾ @ 5
Book Stock, Mixed ... 3½ @ 4
" " No. 2, light ... 2¾ @ 3
Prints ... 1½ @ 2
Pure Manilas ... 2½ @ 2¾
Bogus Manilas and Hardwares ... 1½ @ 1¾
Commons ... 1 @ ..
Binders' Board Cuttings ... 1¾ @ 2
Straw Board Cuttings ... 1¼ @ 1¾

Old Metal.

Copper ... 22 @ 23
Yellow metal ... 16 @ 17
Brass ... 16 @ 17
Heavy Composition ... 19 @ 20
Old lead, solid ... 6½
Tea lead ... 5½
Wrought iron ... 1¼ @ 1½
Sheet iron ... 0¾ @
Cast iron ... 1 @ 1¼
Machinery iron ... 1½ @ 1¾
Zinc ... 5½
Pewter, No. 1 ... 23 @ 24
" No. 2 ... 10 @ 12
Spelter ... 7

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters ... ₩ ℔ 20c
" " Ordinary ... 6c
" Ivory Drop, fair ... 15c
" " best ... 26c
Black Paint, in oil ... kegs, 8c.; ass't'd cans, 11 c
Blue, Prussian, fair to best ... 50 @ 75c
" " " " in oil ... 35 @ 65c
" Chinese, dry ... 83c
" Ultamarine ... 25 @ 30c
Brown, Spanish ... 1½c
" Van Dyke ... 9c
Carmine, 40 ... $12 00
Green, Chrome ... 15 @ 28c
" " in oil ... 18 @ 25c
" Paris ... good, 30c; best, 40c
" " in oil ... " 30c; " 45c
Mineral Paints ... 1½ @ 4c
Orange Mineral ... 14½c
Red Lead, American ... 9½c
" " English ... 10½c
" Venetian (N. C.) dry ... 2½c
" " in oil ... ass't'd cans, 11c; kegs, 8½c
" Indian, dry ... 10c
Rose Pink ... 13c
Sienna, American, Raw ... 4c
" Burnt ... 4½c
" " in oil ... 16 @ 26c
" Raw " ... 15 @ 25c
Umber, Burnt ... 4 @ 8c
" " in oil ... 16 @ 21c
" Raw ... 3½ @ 7½c
" " in oil ... 16 @ 22c
Vermillion, Chinese ... $1 62
" English ... 1 75
" Trieste ... 1 52
" American, Common ... 23c
White Lead, American, pure dry ... 10½c
" " " in oil ... 11½c
White, Paris, English, prime ... in bbls. 2½ @ 2¾c
Yellow Ochre French ... 2½ @ 2¾c
" " in oil ... ass't'd cans, 11c; kegs, 8½c
Vermont ... in casks 1½c
Chrome ... 17 @ 21c
" in oil ... 18 @ 28c
Zinc White, American No. 1 dry ... 9c
" 1, in oil ... 11c
" French (Paris) ... 11 c
" " in oil ... 12 c

Oils.

Linseed Raw ... ₩ gal. casks, 97c. bbls. 98c.
" Boiled ... " $1·02 " $1·03
Whale, Crude ... "
" Bleached Winter ... "
Sperm, Crude ... " 1·50
" Winter unbleached ... " 1.70
" " Bleached ... " 1·75
Seal, Extra Refined ... "
Lard, Pure Winter ... " 82c
" Spring ... "
Cotton Seed, Crude ... " 42½c
" Southern Yellow ... 46½c @ 47½c
" White ...
Neatsfoot, Winter ... 70c @ $1·10
Natural Lubricating ... 38c @ 40c

Sundries.

Asphaltum ... 9c
Benzine ... ₩ gal. 16c
Chalk ... 1½c
" Block ...
Dryer, Patent, Am'n ... ass't cans, 10½c.; kegs, 9c
" " English ... " 11c.; " 9c
Flocks ...
Frostings ... 50c
Glue, White ... 38 @ 47c
" Sheet ... 20c
Glaziers' Points, Zinc ... 9c
Gum, Copal ... 86c
" Damar ... 28c
Shellac, English ... 60c
" dark ... 56c
Litharge ... 10c
Pumice Stone, selected Lumps ... 4 @ 6c
" powdered ... 4c
Putty in bladders ... 3½c
" in bulk ... 3c
Rotton Stone, soft, English ... 8c
Spirits Turpentine ... 48c
Whiting, Spanish ... 1c

Glass.

French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$8·00	$7·00	$6·75	$6·00
8 x 10 to 10 x 14	8·50	8·00	7·25	6·50
10 x 15 to 12 x 16	9·00	8·50	8·00	6·75
13 x 16 to 16 x 20	9·50	9·00	8·50	7·75
15 x 22 to 15 x 30	11·75	10·50	10·00	8·00
16 x 30 to 22 x 30	14·25	12·25	11·00	9·50
15 x 38 to 22 x 36	15·00	13·50	12·00	
24 x 36 to 24 x 40	15·75	14·25	12·50	
28 x 38 to 28 x 42	16·25	14·75	13·25	
28 x 44 to 28 x 50	17·25	15·75	14·25	
30 x 50 to 30 x 54	20·50	17·00	15·50	
32 x 54 to 34 x 56	21·50	19·25	17·50	
34 x 58 to 34 x 60	23·00	21·50	20·25	
36 x 60 to 40 x 60	26·50	24·25	23·00	

DOUBLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$13·00	$12·00	$11·50	$10·00
8 x 10 to 10 x 14	14·00	12·75	12·00	10·75
10 x 15 to 12 x 16	15·00	14·00	13·25	11·25
13 x 16 to 16 x 20	16·00	15·00	14·00	12·50
15 x 22 to 15 x 30	20·00	17·50	16·50	13·25
16 x 30 to 22 x 30	22·00	19·25	17·75	15·00
15 x 38 to 22 x 36	23·75	20·50	19·25	
24 x 36 to 24 x 40	24·75	22·50	20·00	
28 x 38 to 28 x 42	26·00	23·50	21·00	
28 x 44 to 28 x 50	27·50	25·50	22·50	
30 x 50 to 30 x 54	31·00	26·50	24·00	
32 x 54 to 34 x 56	32·50	29·00	26·50	
34 x 58 to 34 x 60	34·50	32·00	31·00	
36 x 60 to 40 x 60	39·50	36·50	35·00	

Sizes above—$12·00 per box extra for every 5 inches.
Discount to the trade. 50&10 to 50, 10&5 per cent.
An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the 84 united inches bracket.

A. C. Downing & Comp'y.

Wm. C. Stuart. **Francis Dougherty.**

Importers of and Dealers in

Window Glass,

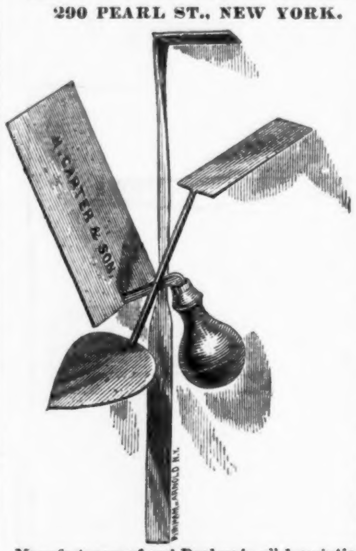
FRENCH PICTURE
And Car Glass, etc.

Estimates given by mail.

57 Beekman & 87 Ann Sts. NEW YORK.

H. CARTER,

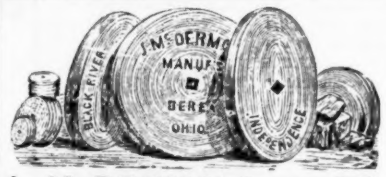
290 PEARL ST., NEW YORK.



Moulders' and Plasterers' Tools.

Manufacturers of and Dealers in all descriptions of Moulders' and Plasterers' Tools, and Dealers in General Hardware, Gilded Copper Weather Vanes, CARTERS' PATENT CARRIAGE LIFTING JACK. &c.

Grindstones, Emery, &c.



J. McDERMOTT & CO
MINERS AND MANUFACTURERS OF
GRINDSTONES.
Black River, Independence and Berea Grits.
BUILDING STONES
of every description, from the above quarries.
OFFICE, National Bank Buildings,
Cor. Superior and Water Sts. CLEVELAND,

Walter R. Wood,

GRINDSTONES

283 FRONT STREET,

NEW YORK.

EMERY WHEELS AND MACHINERY

Upon which to run the same, of all kinds.

EMERY Emery Cloth, Mill Stone CEMENT. TRADE MARK. DIAMOND Tools, Oil Stones,

Soapstone Register Borders.

For particulars, address,

UNION STONE CO.,

16 Exchange and 26 Devonshire Streets, Boston, Mass.

THE TANITE COMPANY
Emery Wheels TANITE Emery Grinders
STROUDSBURG MONROE Co. Pa.

Hardware.

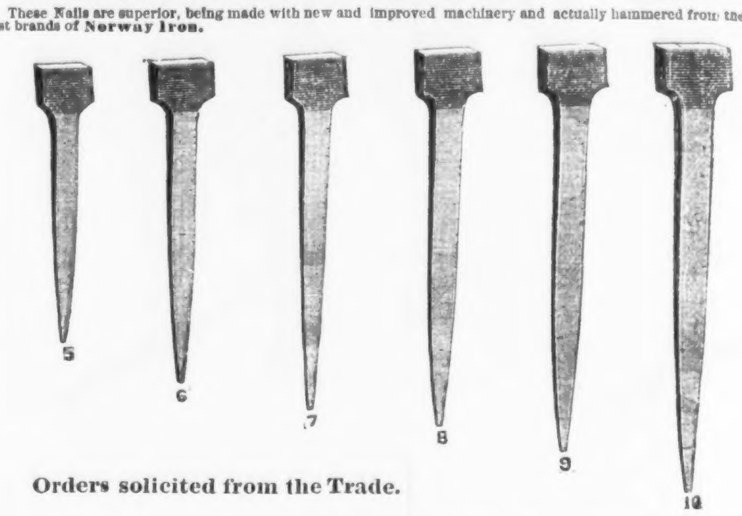
PRATT & CO.,

Hardware & Iron Merchants, Buffalo, N. Y.

Manufacturers of the Superior Brand,

BUFFALO FORGED HORSE NAILS.

These Nails are superior, being made with new and improved machinery and actually hammered from the best brands of Norway Iron.



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GEORGE B. WALBRIDGE,

99 Chambers Street, New York,

Offers at lowest market prices the celebrated

Challenge Augers and Auger Bits

Heretofore made by the Croton Falls Manufacturing Co.

Also, Represents:

Sidney Shepard & Co.,	Pratt & Co.,
Shelton Co.,	D. H. Goodell,
Woolworth Handle Works,	Elephant Edge Tools,
National Horse Nail Co.,	

All goods sold at Manufacturers' lowest prices, and delivered from stock or shipped direct from Factory, as agreed.

YALE LOCK MFG. CO.

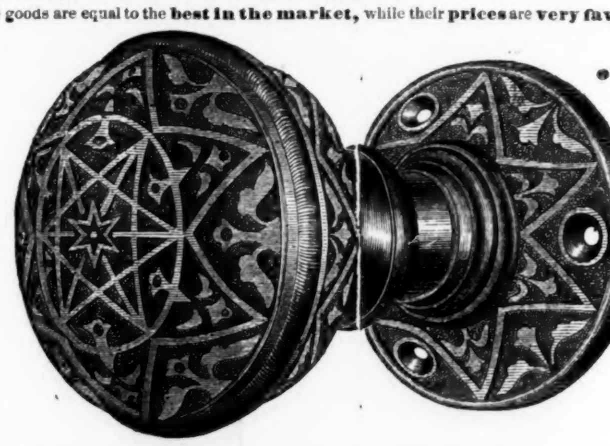
Office and Works at STAMFORD, CONN., Salesroom 298 Broadway, N. Y.

In addition to their line of Celebrated Locks, would particularly call the attention of the Hardware trade to their extensive manufacture of

ORNAMENTAL REAL BRONZE HARDWARE,

Illustrated Catalogues of which will be furnished on application.

These goods are equal to the **best in the market,** while their **prices** are **very favorable.**



The Improved Champion Ice Cream Freezer of 1874,

Is in all respects THE BEST IN THE MARKET.

Patented, July 9, 1872.
TWELVE SIZES.

Geared.

No.	Quart.
20	3
21	4
22	6
23	8
24	10
25	12
26	16
27	20

Fly Wheel.

No.	Quart.
28	16
29	20
30	40

Gang Freezers.

No. 31, two 20 quart together.

Please send for Circulars and Price Lists.

Sole Manufacturers, SIDNEY SHEPARD & CO., Buffalo, N. Y.
GEO. B. WALBRIDGE, Agent, 99 Chambers St., N. Y.

GUILD & GARRISON'S STEAM PUMP WORKS,

Nos. 30 to 34 First Street, Williamsburgh, N. Y.

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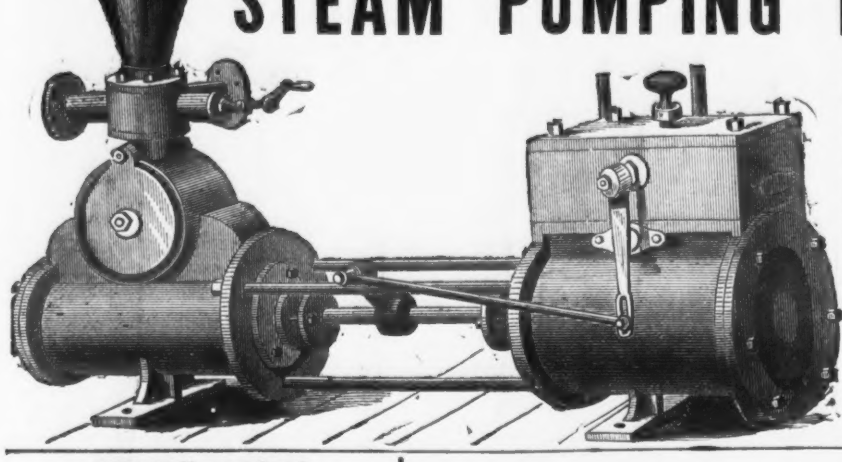

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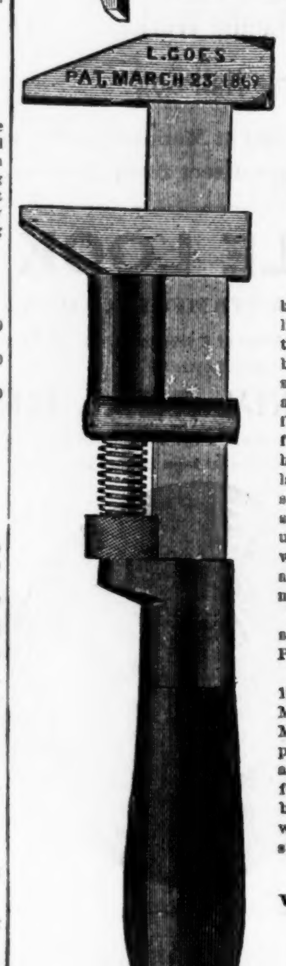

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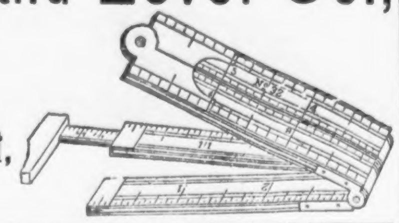

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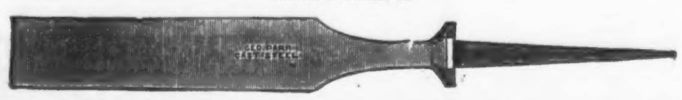

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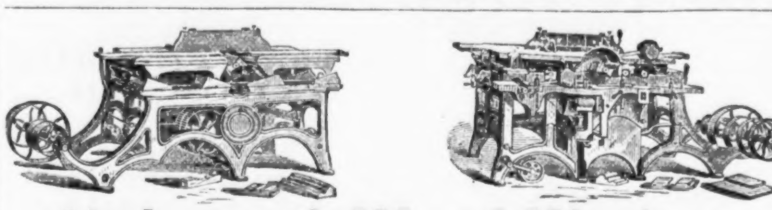

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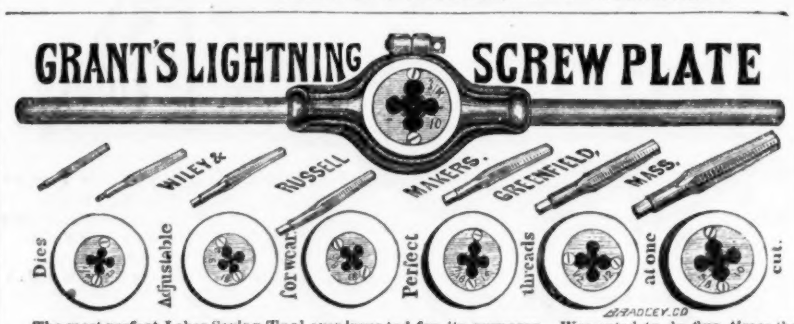

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The pgent articles which have lately appeared in the New York *Times*, and other leading papers, showing the injurious and fatal effects of breathing dry furnace air, which is always more or less contaminated with coal gas and motes of vegetable and animal matter, scorched by contact with the red hot plates, producing what is called "burnt air." have awakened serious attention to this subject, and have created a demand for some improved construction in warming our buildings, combining cheapness in cost and for repairs, safety, comfort, and economy in fuel.

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It has been tested by some of the best and most practical men in this country, to whom reference is made, and we guarantee its satisfactory operation, when put up and used according to our directions.

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2 The air is conducted through wrought iron pipes, placed within the furnace chamber and surrounded by an atmosphere of superheated steam. None of its natural moisture is removed, and therefore no artificial moisture is required.

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The wood work of the house and the furniture are not warped nor displaced.

There is no decomposition of vegetable or animal matter, filling the house with sickening and disgusting odors.

There are no headaches, dizziness, and coldness of the extremities from dry, fiery, irritating heat, which undermines the nervous organization and produces premature decay.

On the contrary, we secure an atmosphere as healthful and delightful as that warmed by the sun, robbing Winter, in our houses at least, of all its terrors.

3 The water for this heater is supplied automatically to an open boiler, constructed as a part of the furnace, the steam generating from the same being superheated by contact with the plates of the furnace, and used as a medium for conveying heat to the pure air passing through the pipes.

Superheated steam conveys heat with the speed of electricity, or about 476 times as rapidly as air, the latter being a slow conductor, and therefore vastly inferior as a medium of communication.

The only outlet for the steam is through two half-inch holes into the ash pit, whence it passes through the burning fuel, aiding the combustion of the gases, and thus economizing fuel.

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They are adapted to the smallest cottage or the largest building, and are set as ordinary portable furnaces, or in brick chambers, as may be preferred.

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See illustration on Fifth page.

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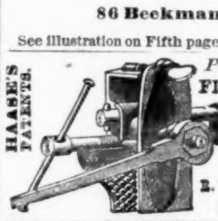

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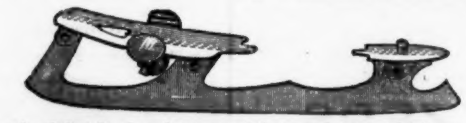

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Per Pair	$3 25	$3 50	$4 00	$5 00	Discount 35 per cent.
Number	50	40	25	20	

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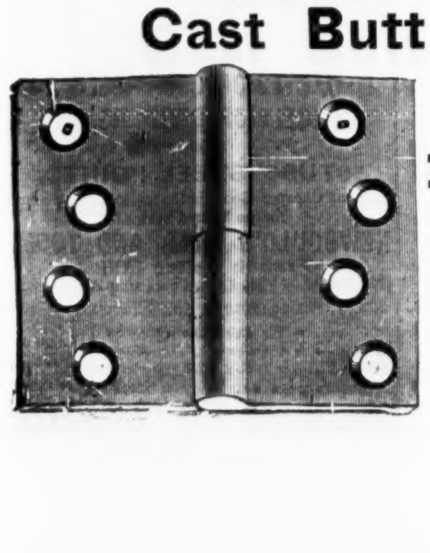
AND

BUILDERS'
HARDWARE.



New York Warehouse with
Messrs. GRAHAM & HAINES,
No. 88 Chambers Street.

Send for Price List.

All kinds of
SMALL CASTINGS
Made to order.

COBB & DREW,

Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets; Common and Swedes Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk Clout and Cigar Box Nails, &c. Rivets made to Order.

NEW YORK AGENCY

Grundy & Kenworthy
HARDWARE.

165 Greenwich Street.

Agent for the Philadelphia Star Carriage and Tire Bolts

SAMUEL LORING'S

PLYMOUTH TACK AND RIVET WORKS
PLYMOUTH, MASS., manufacturer of
TACKS, BRADS, NAILS AND
RIVETS.

Swedes and Common Iron Tacks; Leathered, Carpet Brush, Lace and Gimp Tacks; Finishing, Hungarian, 2d. 2d and 3d Fine, Trunk, Clout, and Cigar Box Nails; Black and Tinned Trunk Nails; Zinc, Iron, Copper and Steel Shoe Nails; Brads and Patent Brads; Glaziers' Points &c., &c., &c., COPPER, BRASS AND IRON RIVETS, of all kinds. Coopers' Rivets, from 1d to 6d. in casks of 100 lbs. each. Hose, Belt and Shoe Rivets and Burs. Oval and Countersunk Heads of extra lengths, made to order. SHIP AND BOILER RIVETS OF ALL SIZES AND LENGTHS

Established in 1810.

HOBART'S TACKS.

Manufactured by

Dunbar, Hobart & Whidden,

Office and Salesroom,

116 Chambers Street, N. Y.

Factory, SOUTH ABINGTON, MASS.

Manufacturers of

American, Swedes and Copper Tacks, Tinned Leathered and Large Head Tacks, Finishing Nails. Black and Tinned Trunk Nails, Miners', Gimp, Lace and Brush Tacks, Hungarian, Chair, Cigar Box and Barrel Nails, Glaziers' Points, Iron, Steel, Copper, Zinc and Brass Shoe Nails, **HEEL and TOE PLATES, STEEL SHANKS, and FANCY HEAD NAILS, SILVER or JAPANNED LINING and SADDLE NAILS.**

A full assortment always on hand at salesrooms, for immediate delivery if required.

Odd and irregular sizes made to order or cut from sample at short notice. Send for Price List.

AMERICAN TACK Co

ATC

MANUFACTURERS OF

Copper, Swedes, and Iron Tacks,
BRUSH, LACE AND GIMP TACKS,
Leathered, Tinned, and Iron Carpet Tacks; Finishing, Black, and Tinned Trunk Nails
Hungarian and Cigar Box Nails;
COPPER and IRON BOAT NAILS
ZINC, COPPER, STEEL, and IRON SHOE NAILS
2d and 3d FINE NAILS;
Bright and Tinned Roofing Nails.
BRADS, PATENT BRADS, &c,
Factory, Fairhaven, Mass.
Salesroom, 117 Chambers Street, NEW YORK

N. B.—Any variation from the regular size or shap of the above named goods cut from sample to order.

GEO. M. EDDY & CO.,

Manufacturers of Measuring Tapes,
353 Classon Avenue, Brooklyn, N. Y.

Manufacturers of Paine's Patent Steel Standard Measuring Tapes, for Surveyors, Engineers and Mechanics requiring a correct measure of great length according to U. S. Standard. Also of Tape measures for the same trades, Lumbermen, Machinists, Tailors, Shoemakers, Dressmakers, &c. Catalogues on application.

SOUTHERN AGENCY

FOR THE SALE OF

CHESAPEAKE CUT NAILS AND SPIKES,
MALLORY, WHEELER & CO.'S LOCKS, KNOBS, &c.
American Screw Co.'s Screws.
AMERICAN BUTT CO.'S Cast Butt Hinges.
PLYMOUTH TACK CO.'S Tacks and Rivets.
ROBERT MANNS' Axes.
WOOLWORTH'S Axe Handles.
BEST NORWAY NAIL RODS, Newton Brands.
M. Rowland & Co.'s Shovels and Spades.
ALSO, HEADQUARTERS FOR
O. AMES & SON'S SHOVELS AND SPADES.
HENRY DISSTON'S SAWS, HAND, CROSS-CUT, MILL, &c.
SHEBLE & FISHER'S Forks.
HARPER'S Hoes and Rakes.
MOSS & GAMBLE'S Files.

The trade can save both time and freight by ordering from our stock containing a large and full assortment of the above goods, which we offer at **Manufacturers' Prices.** Send for Price List.

KEITH & KELSO,

Hardware Commission Merchants,
Nos. 23 and 25 South Charles St., BALTIMORE, MD.

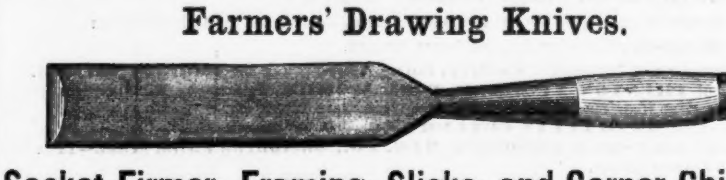
The Hart, Bliven & Mead Mfg. Co.

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.
Factories at KENSINGTON, CONN.

MANUFACTURERS OF

Carpenters' Tools.

Carpenters', Coach Makers' Wagon Makers' and Farmers' Drawing Knives.

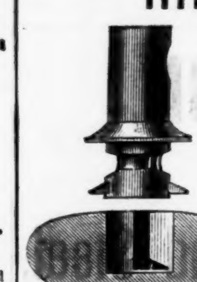


Socket Firmer, Framing, Slicks, and Corner Chisels.

Every Tool Warranted.

Send for our Catalogue and Appendix. Price $4·50, and charge remitted on receipt of subsequent orders.

Improved Door Knobs.



PAT'D, JAN 10TH 1865.

On the 10th January, 1865, we obtained Letters Patent for improved method of securing necks to Mineral and Porcelain Door Knobs, which improvement was used by us long enough to prove its utility, but on account of unsettled claim of joint ownership by former partner, its use was discontinued. Having now made a further improvement, for which we have made application for a Patent, we are now making the **BEST SECURED** and **MOST DURABLE** Mineral and Porcelain Door Knobs ever offered in this or other markets.

We solicit orders for these Knobs at our regular prices for old styles, with the understanding that if any can be loosened from or gotten off the necks without breaking the tops, they may be held by the purchaser subject to our order, with expenses added.

See *The Iron Age*, of August 21st, page 11, for reduced list prices on Locks and Latches; also, for illustrated description of our patent **Telescope Locks and Latches,** with patent Flat **Steel Perforated Keys,**

Address
BRANFORD LOCK WORKS,
Branford, Conn.

Or, THE HART, BLIVEN & MEAD MANUFACTURING CO., Agents,
18 & 20 Cliff and 243 & 245 Pearl Streets, New York

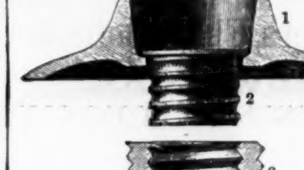
"Easily Applied and not Liable to get out of Order."—From Report of Judges at American Institute Fair, 1872.

The Challenge Door Spring Co.,
Exclusive Manufacturers of the

In Appearance the Most Beautiful. In Action the Most Graceful. In Use the Most Reliable.

The Challenge Springs are manufactured from **Steel Wire, tempered by an Improved Process,** the result of repeated experiments, and must not be classed by dealers with the numerous worthless "Coil Springs" made from common Bed Spring Wire.

No. 49 Ann Street, NEW YORK.



PATENT DOOR-KNOB ROSETTE.

No. 1, Rosette.
No. 2, Screw entering No. 3.
No. 3, Stationary bushing remaining firmly in door.

The Wethersfield Novelty Co.

MANUFACTURERS OF

Builders' Hardware and Plated Goods.

BRASS AND IRON FOUNDERS.

Particular attention given to Light Manufacturing for outside parties; also,

BRASS & IRON FOUNDING, SILVER & NICKEL PLATING. Orders Solicited.

We would call the particular attention of the trade to our **PATENT IMPROVED ROSETTE** for Door Knobs. This Rosette does away with the small screws and *cannot* work loose. It can be applied four to one faster than any others. Can be applied to old doors.

Factory on the Valley R. R. at Wethersfield, Conn.
Communication from Hartford (2 miles) by horse or steam cars.

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton.)

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.—Solid Cast Steel........₩ ℔ 14c
Peter Wright's........₩ ℔, gold, 12½c
Wilkinson's........11½c
Eagle........11 cents currency—dis 15 @ 15&5 %
Apple Parers.—Reading Improved........per doz $8 50
Victor, Improved........8 25
Union........8 00
Turn Table........8 50
Discount for 25 dozen lots........50c
Axes.—Mann's Light........Per doz. $13 00 @ 14 00
Hunt's Light........14 00 @ 14 50
Red Indian, all sizes........12 00 @ 12 00
Red Chieftain, all sizes........12 50 @ 13 00
Crown Prince........13 00 @ 13 00
Augers and Auger Bits.—Pierce's Pat........dis 25 %
Twist Bits........dis 30&10 %
Bates' & Ives' Bits........dis 30&10 %
Douglass' Bits........dis 30&10 %
Hamden Auger Bits........dis 40 %
Cook's Bits........dis 25 %
Bonney's Pat. Hollow Augers........dis 25 %
Stearn's Patent Hollow Augers........dis 10 %
Russell Jennings' Bits........dis 30&10 %
Bates' & Ives' Nut Augers........dis 30&10 %
Douglass Nut Augers........dis 10 %
Watrous' Ship Augers........dis 15 %
Balances.—Landers Frary & Clark's........dis 15 %
Chatillion's........dis 15 %
Morton's........dis 15 %
Common Spring, with Hook........₩ doz $1 85 @ 2 00
Bells.—Bevin Bros. Mfg. Co. Full Weight Hand Bells........dis 30&10 @ 60 %
Bevin Bros. Mfg. Co., Extra Light Hand Bells........dis 60 @ 60&10 %
Other makers light........dis 60&10 %
Connell's Door Bells........dis 50 %
Great Western and Kentucky, Cow........dis 50&10 %
Boring Machines.—Bates' Mfg. Co., complete with augers........dis 15 @ 20 %
Douglas' Mfg. Co., complete with augers........dis 15 @ 20 %
Common, Boring Machines, no Augers........$4 25 @ 4 00
Angular, " "........5 25 @ 5 00
Bolts.—Eastern Carriage Bolts........dis 70&10 %
Western " "........dis 70&10 %
Philadelphia " "........dis 50&10 %
Wrought Shutter Bolts........dis 45 @ 50 %
Cast " "........dis 30&10 %
Skelly's Phila. Norway iron, finish, points........dis 50&5 %
Braces.—Barber's........dis 40 %
Backus........dis 40&10 %
Bartholomew's American Ball........dis 40&10 %
Spofford........dis 40 %
Butts.—Cast Fast Joint, Narrow........dis 40 %
" " " Broad........dis 40 %
Cast Loose Joint........dis 50 %
" " Acorn, Loose Pin........dis 40 %
Wrought Loose Pin........dis 30 %
" Table Hinges and Back Flaps........dis 35 %
" Narrow........dis 30 %
" Loose Joint........dis 30 %
" Reversible........dis 35 %
Parker's Blind Butts
Shepard's " "........dis 15 %
Clark's " "........dis by the case 50 %
Garretson's " "
Lull & Porter's "
Cherritree Blind Butts for wood........dis 25&10 %
" " " "........dis 50 %
Chains.—German Halter........new gold list dis 10 %
" Coil........new gold list dis 10 %
Galvanized Pump........₩ ℔ 15c
Best Proof Coil Chain—
₩ ℔........13¾ 10¾ 10 9¼ 9¼ 9 8¾c gold
3-16 ¼ 5-16 ⅜ 7-16 ½ ⅝ in.
By the cask, 500 lbs., discount ¼c per lb. Common Chain, ½c per lb. less than proof.
Chisels.—Socket Framing........dis 60 @ 60&10 %
Socket Firmer........dis 60 @ 60&10 %
Tang........dis 40&10 %
Beaty's Framing and Firmer........dis 10 @ 15 %
Casters.—Porcelain Wheel........dis 25&10 %
Iron........dis 25&10 %
Brass........dis 25&10 %
Clothes Wringers.—Universal........per doz $72 00
Novelty........72 00
Reliance........72 00
Providence........72 00
Orders for 5 dozen, discount $3 per dozen.
King Wringers (Iron Frame)........per doz $68 00
Coffee Mills.—Common Box and Side........dis 10 @ 15 %
Patent Box and Side........dis 10 @ 15 %
Cutlery.—American Pocket (best)........dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
Drawing Knives.—Hart Mfg. Co.s........dis 60 @ 60&10 %
Concave Adjustable Handle........dis 10 %
Bogey—Window Blind........dis 10 @ 15 %
Fry Pans.
Tinned........dis 20 %
$3 00 3 25 3 62 4 00 4 50 5 00 5 50 6 00 7 50
No........0 1 2 3 4 5 6 7 8
Burnished
$2 80 3 00 3 38 3 75 4 12 4 50 5 00 5 62 6 75
No........0 1 2 3 4 5 6 7 8
Files.
Nicholson Mill Files........new list, $5 00 to £ cur dis 10 %
" Bastard........5 00 to £ cur dis 10 %
" Taper........5 00 to £ cur dis 10 %
Butcher's Mill........$5 75 to £ gold
" Bastard........5 50 to £ gold
" Taper........5 50 to £ gold
Moss & Gamble—Mill, Taper and Bastard........5 50 @ 5 25 to £ gold
Fluting Machines.
Royal, No. 1, 4½ inch Rollers........list $6 00
" No. 2, 6 "........list 7 00
K. F. M.—4½ in. rolls........5 00
" 6 in. rolls........6 00
Hammers.
Yerkes & Plumb's........dis 18 %
Hammond & Son's........dis 5 %
Verce........dis 5 %
Hatchets.
Beatty's........dis 10 @ 15 %
Shingling and Half. { ₩ doz...$7 00 7 30 7 75 8 00 / No........1 2 3 4 }
Yerkes & Plumb........dis 10 %
Shingling and Half { ₩ doz...$7 00 7 50 8 00 8 30 / No........1 2 3 4 }
Claw........₩ doz........$7 50 8 00 8
Hinges.—Strap and T, advanced Feb. 6........dis 25&7½ %
Bonney's No. 1 Gate........dis 25 %
" No. 2 and 3........dis 35 %
Horse Nails. Nos. 6 7 8 9 10
Ausable........28 26 25 24 23
Globe........28 26 25 23 22
Brundage........26 24 23 22 21
Nos. 5 6 7 8 9 10
........28 26 24 23 21
Putnam........30 28 26 25 24 22
On Ausable, Globe and Brundage 1000 ℔ lots........dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination........dis 50 %
Extra discount for cash 2 %
Porcelain and Mineral........dis 20 %
Locks and Latches.—Rim and Mortise........dis 50 %
Extra discount for cash 2 %
Till and Cupboard........dis 25 %
American Padlocks........dis 50 %
Scandinavian Pad Locks.
₩ doz........$3 50 10 50 12 00 15 00 15 00 } dis 15 %
No........9¼ 10 10¼ 11 11¼
₩ doz........$18 00 18 00 20 00
No........12 12½ 13 13¼
Trunk Locks........dis 5&10 %
Thumb and Buggenns Latches........dis 15 %
Lanterns.—Square Candle and Oil........dis 15 %
Globe for Oil........dis 15 %
" Kerosene
Tubular Lanterns........dis 15 %
Mattocks.—Long and Short Cutter........dis 5 @ 10 %
Western Pattern........dis 25 %
Pennsylvania Pattern........dis 10 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets........dis 10 %
Stebbins' Gates........dis 10 %
Lincoln's........dis 10 %
Landers, Frary & Clark's Petroleum........dis 25 %
Taylor's Petroleum Faucets........dis 25 %
Brass Liquor Cocks........dis 15 %
Meat Cutters.—Dixon's........dis 20 %
Woodruff........dis 60&10 %
Stowe........dis 40&10 %
Hale's........dis 40&10 %
Stuffers........dis 20&10 %
Planes.—Auburn Tool Co. "Bench"........dis 20&10 %
Taber Plane Co. "Bench"........dis 10 %
Metallic Plane Co........dis 10 %
Evans Pat. Circular........net
Planes Irons.—American........list net
Butcher's........gold £, $5 50
Picks.—Philadelphia........net
Pittsburgh........net
Plumbs and Levels.
Stanley Rule and Level Co........dis 60 @ 60&10 %
Wm. Johnson, (Stanley List)........dis 60 @ 60&10 %
Rakes.—Cast Steel Garden........dis 33⅓ %
Malleable Garden........dis 33⅓ %
Wood Head Iron Teeth........dis 30 @ 40 %
Rules.—Stanley Rule and Level Co........dis 60&10 %
Steven's and Hubbard's........dis 60&10 %
Shears.—American Pattern........dis 15 %
₩ doz........$3 50 7 00 9 00 10 00 11 00 12 00
No........50 100 150 200 250 300
English Pattern........dis 15 %
₩ doz........$7 00 8 67 10 67 12 67 14 67 16 67
No........50 100 150 200 250 300
L. F. & C. Excelsior........dis 10 %
₩ doz........$3 00 10 00 12 00 19 00 18 00 21 00
No........50 100 150 200 250 300
Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened........$11 00 net
Clipper No. 10, Boxed and Sharpened........₩ doz $10 50
" "........10 00
Common Scythes........₩ doz $7 00 @ 10 00
Squares.—Steel and Iron, new list........dis 50 %
Saws.—Disston's Hand........dis 12½ %
Disston's Cross Cut........dis 12½ %
W. McNiece's H'd, Cross-Cut & Circ'r, new list........dis 15 %
Boynton's Lightning, new list........dis 30 %
Shovels and Spades.
Rowland's Plain Back, list Feb., 1873........dis 30&10 %
" Back Strap "........dis 30&10 %
Oliver Ames & Sons........new list dis 12½ %
Brady Shovel Co........dis 12½&5 %
Sad Irons.—Richmond (polished face)........per ℔ 4⅝c.
Coquanock (polished face)........4⅝c.
Stone.—Arkansas Oil, No. 1........₩ ℔ $1 38
Turkey Oil, No. 1........1 00
Washita Extra........30c
" No. 1........22c
" 2........18c
Hindostan No. 1........5½c
" Axe........7c
Screws.—Iron........new list, Jan. 1st, 1874, dis 52½ %
Brass........dis 52½ %
Spoons.—
Plated Spoons, Rogers Bros.'........new list dis 30 @ 30&5 %
Britannia, Spoons........dis 40 @ 40&5 %
German Silver........new list dis 10 @ 15 %
" Light........new list dis 15&5 %
Lalance & Grosjean Iron........dis 10 %
Springs.—Gray's Door........dis 40 %
Torry's Door........dis 40 %
Stocks and Dies........dis 15 %
Stove Polish.—Gem........₩ gross, $5 00
Onyx........" $5 00
Try Squares.—Winterbottom........dis 10 @ 15 %
Stanley Rule and Level Co........dis 45&10 %
Willis Thrall, No. 2........dis 30&10 %
Disston's No. 2........dis 40 %
Tacks, &c.—Half Weight Tacks........dis 70 %
" " by the case........dis 70&7½ %
Clout and Finishing Nails........7½ %
" " " by the case........dis 7½ %
Traps.—Genuine Oneida—Newhouse list........dis 20 %
Imitation " " "........dis 30 %
Vises.—Solid Box........₩ ℔ net 15c
Wrenches.—Coes Genuine........dis 40 %
Coes Imitation Wrought Bar........dis 50 %
" " Malleable Bar........dis 60 %
" " (Kellogg) Malleable Bar........dis 50 @ 1? %
Tafts Pattern (Wrought Bar)........65 %
" " Kellogg's (Nail Bar)........dis 65&10 %
Philadelphia Tool Co.'s Pat. Duplex........dis 25 %
" " " Improved Baxter........dis 25 %
" " " Adjustable Fork........dis 25 %
Wire.—No. 0 to 18........dis 35 @ 37½ %
No. 19 to 26........dis 40 @ 42½ %
No. 27 to 36........dis 45 @ 47½ %
Coppered 0 to 12........dis 15 @ 20 %
Tinned Broom Wire........dis 20 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

Feb 16, 1874.

Augers—C. S. Cut, French, Swift & Co........dis 30&10 %
Bits, Auger—Pierce's........dis 30 %
Snell Mfg. Co........dis 20 %
Jennings........dis 10 %
Bells, Cow—Yaw's Genuine........dis 25 %
Bolts—Carriage and Tire, Square Neck........dis 70&10 %
Diamond Neck........70&10&10 %
Braces—Bit, Spofford's Patent........dis 40 %
Brads, Cut........dis 50&7½ %
Boards—Stove, Brooks' Patent........dis 30 %
Butts—Brass........dis 25 %
Cast Loose Joint........dis 50 %
" " Pin........dis 45 %
" " " Japanned........dis 45 %
" " " Silver Tipped........dis 25 %
Wrought Narrow........dis 30 %
" Broad, Loose Joint........dis 35 %
" Table and Back Flaps........dis 30 %
Wrought Butts, Loose Pin........dis 35 %
Belting—Rubber........dis 30 @ 30&5 %
Leather new list........dis 30 @ 30&5 %
Beaters, Egg, "Peerless"........per doz $4 00
Brick—Bath (box of 2 doz) Best English........$1 50
"Rutherford"........$1 25
Chalk—White, Carpenter's........₩ gross, 50c
Red, Carpenter's........" 75c
Blue, "........" 90c
Chisels—Firmer Socket........dis 60&10 %
Framing Socket........dis 60&10 %
Corner Socket Chisels........dis 60&10 %
Slick's Carpenters'........dis 60&10 %
Castings—Malleable........₩ ℔ 10½c
Cherry Seeders........per doz $12 00
Elbows—Corrugated........5 5½ 6 7
Charcoal........$4 25 5 25 5 25 6 50 } dis 15 %
Russia........10 00 13 00 13 00 14 00 }
Files—Wheeler, Madden & Clemson's........dis 45 %
Freezers, Ice Cream—"Champion"........dis 33⅓ %
Gates—Molasses—
Patent Self-Measuring........₩ doz., $42 00; dis 20 %
Hinges—Window Blind—
Clark's No. 20........$1 50 per doz net
Shepard's Standard, and Clark's........dis 50 %
Wrought Strap and T........dis 25&7½ %
Hods, Coal—Plain, Black and Galvanized........dis 10 %
Funnel, Black and Galvanized........dis 10 %
Fancy and Helmet........dis 10 %
Palace Coal Vases........dis 10 %
Hammers—Maydole's........net
Yerkes & Plumb's........net
Hooks and Staples—Wrought........dis 5 @ 10 %
Hooks—Belt........dis 60&10 %
Hasps and Staples—Wrought........dis 50 %
Sad Irons........dis 60&10 %
Kettles—Brass........4⅞c
Enameled........₩ ℔, 50 @ 5?c
Knives, Drawing—Oval No. 1........dis 40 %
Razor Blade........dis 60&10 %
Lanterns "Peerless,"........No. 1 5 10........dis 50&10 %
₩ doz $26 00 $11 25 $13 75 dis 10 %
Gem, with guards........$6 50
Tubular........11 50
" with Guards........12 00
Machines—Apple Paring, "Reading,"........$8 00 @ 8 50 ₩ doz
Mills, Coffee—Box and Slide, common........dis 15 %
Box Union and Eagle........dis 15 %
"Enterprise"........dis 20 %
Nails—Clout and Finishing........dis 7½ %
Shoe........dis 7½ %
Horse, Ausable........No. 5 6 7 8 9 10
30 27 25 24 23 22c
" " Finished & Pointed........add 1c ₩ ℔
" " 1000 lbs........dis 5 %
" Clinton........No. 6 7 8 9 10
22 20 19 18 17c
Packing—Rubber........dis 30 @ 30&5 %
Pencils, Slate—Soapstone........4 5 6in.
Case lots........30 40 50c. ₩ 100
Paint—White Lead, U. S. Gov't........dis 20 %
Rivets—Iron, Black and Tinned........₩ ℔ 9 c
Copper........dis 20 @ 25 %
Rope—Manila, ¾ inch and larger........dis 10 %
Rules—Boxwood and Ivory, Stephens........₩ ℔ 15¾c
Screws—"American Screw Co"—........dis 60 %
Flat Head, Iron........dis 52½ %
Flat Head, Brass........dis 52½ %
Staples—Blind, Boardman's Pat., ½ & ⅝........₩ ℔ 37c
Skates—White's........dis 25 %
Barney & Berry's—N. Y. Club Japanned Top........$2 20
" " B. & B. Club Blued Top........2 85
Straps, Skate—Russet and Black........dis 25 %
Spoons, Iron Tinned........dis 10 %
" by the case........dis 20 %
Plated Rogers' A No. 1........dis 30&5 %
Britannia........dis 40 %
Squares—Steel and Iron........new list 50 %
Shoes, Horse—H. Burden & Sons........₩ keg $5 50
Shovels & Spades—Shepard, Forsyth & Dennison........dis 20 %
Saws—Henry Disston & Sons........dis 10 %
Scales—Buffalo Scale Works........dis 25 %
Fairbanks........dis 15 %
Shears—Seymour's........dis 60 %
Traps, Steel—Newhouse........dis 20 %
Tacks—Half Weight Am. Iron........dis 70&7½ %
Vises—Parallel, Buffalo........dis 15 %
Wrenches—Coes' genuine........dis 40 %
Coes' Imitation........dis 50&10 %
Tafts' Pattern........dis 65&10 %
Ware—French, Tinned and Iron........dis 30
Stamped and Japanned........net
Cast Iron Hollow........dis 25 %
Tin Plates.—Add for each X........2 50

10x14, IC, Charcoal	$13 00	14x20, terne	11 75 @ 12 00
12x12, "	13 50	20x28 C, "	25 00
12½x17, "	12 50	20x28 X, "	29 25
14x20, "	14 00		

Pig Tin—Straits........35c @ 36
Bar Tin........37c
Solder........No. 1, 20 c; No. 2, 18 c
Sheet Zinc—
"Lasalle"........570 100 ℔ casks
$10 00 10 30 ₩ 100 ℔s
Sheets........$10 00
Iron Wire—Bright and Annealed........dis 35 %
Coppered........dis 30 %
Tinned........dis 15 %
Tinned Broom, { Nos. 20 21 22 / 20c 21c 21c }........dis 20 %
Copper—Sheathing 14 @ 18 oz........₩ ℔ 33c
Planished........₩ ℔ 39 @ 41c
Bottoms........₩ ℔ 35c
Bolts........₩ ℔ 35c
Braziers' Sheets........₩ ℔ 32c
Sheet Iron.—
18 Common........$5 20
24 Common........5 50
24 W. D. Wood & Co., Smooth Finish........6 10
Am. Russia........A. 14c B. 11c
Gen. Russia, No. 1 stained........20c
" " clean........21c
Galvanized........dis 15 %

PITTSBURGH.

Card Rates, 60 days.

Flat Bar—		1½ & 1¾ x ⅜ to ¾ in	3·5c
1½ to 4 x ⅜ to 1 inch	3·3c	1 & 1¼ x ⅜ to ¾ in	3·6c
4½ to 6 x ⅜ to 1 inch	3·5c	⅝, ¾ & ⅞ x ⅜ to ⅝ in	3·7c
1½ to 6 x 1⅛ to 1½ in	3·7c		
Horse Shoes.—		Nail rods	7·2c
All sizes	4·8c		
Heavy Bands.—		⅞ to 1¼ x ¼ & 5-16 in	4·3c
3½ to 6 x ¼ & 5-16 in	3·9c	⅝ to ¾ x ¼ & 5-16 in	4·5c
1¼ to 3¼ x ¼ & 5-16 in	4·0c		
Light Bands.—			
3 to 6 x 3-16 to No. 12	4·3c	1 to 1⅛ x 3-16 to No. 12	5·9c
1⅛ to 2¾ x 3-16 to No. 12	4·5c	¾ to ⅞ x 3-16 to No. 12	5·5c
Hoops.—2¼ to 3 in	4·6c	1 in	5·8c
3¼ to 4¾ in	4·8c	⅞ in	6·3c
1¾ to 2 in	4·8c	¾ in	6·8c
1⅜ to 1 11-16 in	5·1c	⅝ in	7·3c
1⅛ & 1¼ in	5·4c	½ in	7·8c

Round and Square.—		½ to 7-16	4·0c
1 to 1⅞ in	3·3c	⅜ in	4·1c
2 to 2⅞ in	3·6c	5-16 in	4·5c
3 to 3½ in	3·8c	¼ in	5·9c
3¾ to 4 in	4·3c	3-16 in	6·9c
⅝ to 9-16 in	3·7c		
Oval Iron.—			
⅞ to 1½ in	3·9c	½ in	4·3c
⅝ to ¾ in	4·1c	⅜ in	4·9c
Half Oval and Half Round.—			
⅞ to 1½ in	4·2c	½ in	5·4c
⅝ to ¾ in	4·7c	⅜ in	6·9c

	Bolted.	Charcoal.	Jun.
Sheet Iron, 10 to 14	5·3	6·8	8·3
" 15 to 20	5·5	7·0	8·5
" 21 to 24	5·7	7·2	8·7
" 25 to 26	5·9	7·4	8·9
" 27	6·1	7·6	9·1

All sheets over 28 in. wide, ½c. ₩ ℔ extra.

Tank Iron—		Heads flanging	9·0c
3-16, ¼ & ⅜ in. thick	5·3c	Plow Slabs	5·9c
Boiler Plate Iron	5·0c	Plow Wings	6·4c
Heads not flanging	6·2c		
Railroad Iron—Countersunk and Punched.—			
1¼ x ⅜, 7-16 & ½ in	4·3c	1⅜, 1¾ & 2 x ½ & ⅝ in	3·8c
1¼ x ¼ & 5-16 in	3·3c	1½ x ⅜ in	4·0c
Extras for Cutting to Length.—			
Flat bars and rounds and squares	0·1c	Light bands and wagon box iron	0·2c
Flat bars for tire	0·1c	Hoops	0·3c

The following are the Card rates of Lewis, Oliver & Phillips:
Iron, standard list, assorted sizes, for large orders, 3·3c, card rate, 2 % off net.
Flat Rail (1¼x¼), punched and coun'sunk........4·7c ₩ ℔ net
Iron Wedges........5c ₩ ℔ net
Norway Nail Rods........9½c ₩ ℔ net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point)........6 c ₩ ℔ net
Beetle Rings........9½c ₩ ℔ net
Fence Pickets—
⅜ round, bent to shape, 30c ₩ ft. of fence, less 5 % off net
Discount off Standard List.
Carriage and Tire Bolts (new list)........70&5 % off net
Plow Bolts........30&5 % off net
Stove Bolts........5 % off net
Machine and Square Head Bolts........30 % off net
Coach and Lag Screws........30 % off net
Bolt Ends........25 % off net
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 3¾c ₩ ℔ net; ⅞, ¾ in. diam. 3¾c ₩ ℔ net; ⅝ in. diam. 4½c ₩ ℔ net.
Patent Headed Harrow Teeth, packed in casks, ½c ₩ ℔ ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅜ in. diam. 7c ₩ ℔ net; 9-16 in. diam. 8c ₩ ℔ net; ½ in. diam. 9c ₩ ℔ net. 1c ₩ ℔ extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ⅜ to 1 in. diam. 9½c ₩ ℔ net; ⅝ in. diam. 10½c ₩ ℔ net; ½ in. diam. 12½c ₩ ℔ net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 24 in. long, 6c ₩ ℔ net; 8, 10 & 12 in. long, 7½c ₩ ℔ net.
Strap and T Hinges..40 % off net, delivered as customary
Screw Hitching Rings........$5 50 ₩ 100 net
Duck Nest Tuyere Irons........$15 00 ₩ doz net
Cast Iron Washers........₩ ℔ 4½c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long........₩ ℔ 4½c net
1 to 2 in. diam. from 4 to 8 ft. long........" 4¾c net
1 to 2 in. diam. from 1½ to 4 ft. long........" 5½c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long........" 5¾c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long........" 6½c net

WAGON HARDWARE.

Wagon Box Strap Bolts—
10 in. long by 7-16 at Screw End, ₩ set of 8 bolts........55c
12 " ⅜ " " 8 "........70c
10 " 9-16 " " 8 "........} 90c
12 " 9-16 " " 8 "........}
14 " 9-16 " " 8 "........$1 00
10 in. long by ⅝ at Screw End, ₩ set of 8 bolts........} 1 00
12 " ⅝ " " 8 "........}
14 " ⅝ " " 8 "........1 10
16 " ⅝ " " 8 "........1 20
5c ₩ set for each additional inch over 14 in. All lengths made.
Wagon Box Rods, narrow track, each........18c
" " wide track, each........20c
Single Tree Irons, ₩ set of four pieces........38c
Wrought Iron Bolster Plates, 2¾ in. wide, ₩ set........60c
" " 3 " "........65c
" " 3¼ " "........70c
" " 3½ " "........75c
Wagon Brake Ratchets, each........16½c
" " " finished with guard, each........45 c
Wrought Hammer Straps, heavy pattern, each........16 c
" " " light " each........13½c
" Rub Irons, each........11 c
Stay Chain Hooks, each........8 c
Double and Single Tree Clips, figure 1, each........9 c
" " " " 2, each........10 c
" " " " 3, each........12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 100 sets........dis 25 %
Wagon Box Staples 1½ to 2½ in. to clinch, ₩ 1000 $12 50 net
" " Box Iron, to rivet on, ₩ 1000 8 50 net
Neck Yoke Eyes, each........5½c net
" " with ⅜ rings, each........8 c net
King Bolts, ¾, 1, 1⅛, and 1¼ in. diam........₩ ℔ 4¾c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths........" 9 c net
Wagon Rivets, 3-16 in. diam., all lengths........" 11 c net
" & Nails, in 5 ℔ paper boxes........₩ ℔ 1c extra
" " in 25 ℔ wood "........" ½c extra
Wagon and Hinge Nails, ¼ in........₩ ℔ 17 c net
" " " 3-16 in........" 19 c net
Double Tree Plates........}
Coupling "........} " 9 c net
Tongue "........}
Neck Yoke Plates........" 12 c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₩ ℔ as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in, ₩ ℔ 11½c net ¼ in., 12½c. net

DETROIT.

(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal		**Copper.**—	
IC, 10x14	$18 00	Sheathing	33c
IX, 10x14	15 75	Copper Bottoms	36c
XX, 10x14	18 50	**Planished Copper.**—	
IC, 12x12	13 50	Sheathing, 14x48	41c
IX, 12x12	16 25	Boiler Size, No. 7	43c
IC, 14x20	14 00	" " No. 8	43c
IX, 14x20	16 75	" " No. 9	43c
XX, 14x20	19 50	**Pig Tin.**—Large Pigs	35c
XXX, 14x20	22 25	Small Pigs	36c
XXXX, 14x20	25 00	Bars	37c
DC, 100 Plate	12 50	**Solder.**—No. 1	18c
DX, "	15 25	No. 2	20c
DXX, "	18 00	**Bright Wire**	dis 35 %
DXXX "	20 75	**Sheet Iron.**—	
DXXXX 100 Plate	23 50	No. 18 Am. Com	5 50
IX, 14x14	25 00	No. 24 Am. Com	5 50
IC, 10x14 W	12 50	Pat. Am. Russia "A,"	
IX, 10x14 W	15 25	Nos. 24, 25 & 26	c
Roofing Tin.—Best Char.		Pat. Planished Russia	c
IC, Terne, 14x20	$12 25	Russia No. 9, 10, 11&12	c
IX, " 14x20	15 00	W. D. WOOD'S & CO.'S SHEET IRON.—	
IC, Terne, 20x28	26 00	Nos. 15 to 20 Smooth	$6 10
IX, " 20x28	30 50	" 21 to 24	6 30
Coke Tin.—		" 25 & 26	6 50
IC, 10x14 Coke	$11 00	" 21 to 24 Char'l	7 80
IX, 10x14, Coke	13 75	" 25 & 26 "	8 00
IC, 14x20, "	12 00		

Sheet Zinc.—Any width........10 c

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal........$12 00 @ 14 00
I. X. 10x14 Charcoal........15 50 @ 17 00
I. C. Terne 14x20........11 00 @ 12 50
I. C. Terne 20x28........24 00 @ 25 50
I. C. Continuous........28 00

Block Tin.—		Bars	₩ ℔ 39c
Pigs	37½c @ 38c		
Solder.—		A 1	₩ ℔ 24c
S. & Co	₩ ℔ 28c	Roofing	" 22c
Lead.—Pig	₩ ℔ 7½c @ 8c.	Bar	₩ ℔ 8c @ 9c
Copper.—			
Ingot	₩ ℔ —	Sheets, 6 to 9 ℔	₩ ℔ 41c
Planished	" @ 40c	" 10 to 12 ℔	" 33c
Sheathing	" @ 35c	Braziers 13 lb	" 35c
Copper Drops	37c @ 38c	Copper Bottoms	" —

Zinc.—Cask, 500 to 1000 lbs........₩ ℔ 11 c
Case, 100 lbs........" 11½c
Slab........" 8½c @ 9c

Brass.—		Roll, No. 38 to 40	₩ ℔ 50c
Roll, No. 6 to 30	₩ ℔ 45c	Wire, No. 0 to 20	₩ ℔ 50c
" 30 to 38	" 65c	" 20 to 25	" 60c
Babbit Metal.—		Black Lead	₩ ℔ 25c
Sellew & Co	₩ ℔ 35c	Market	" 15c

Antimony........₩ ℔ 20c
Bismuth........₩ ℔ $6 00
Nickel........₩ ℔ $3 00
Sheet Iron.—
Russia........₩ ℔ 20c @ 22c | Am Russia A........₩ ℔ 14 @ 15c
" " B........" 13 @ 14c

	Com. B.	Smooth Fin. S. L. U.	Smooth D Re'fd.
15 to 20	6·0c	7·5c	9·0c
22 to 24	6·2c	7·8c	9·2c
26	6·4c	8·0c	9·4c
27	6·6c	8·2c	9·6c

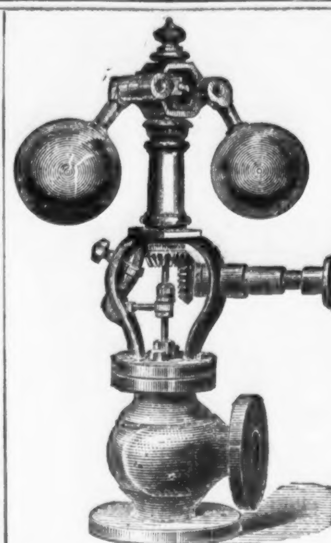
Galvanized Iron.—Full bundles........dis 25 %
Nos. 18 to 20........15c | No. 27........18c
22 to 24........16c | 28........20c
25 to 26........17c
Bar Steel.—Silver, ₩ ℔ 21c; Crescent, 17½c.
Iron Wire........dis 25 %
Enameled Ware........dis 33⅓ %
One Piece Corrugated Elbows........dis 10 %
Iron Gas Pipe........dis 65 %

Charcoal Iron.		Russia Iron.	
4½ inch........₩ doz	$3 75	4½ inch........₩ doz	$8 00
5 "	4 25	5 "	10 00
5½ "	5 25	5½ "	13 00
6 "	5 25	6 "	13 00
7 "	6 50	7 "	14 00

Leader Elbows—Flat Crimp Retinned.—

	₩ doz.		₩ doz
2-inch	$2 00	2½-inch	$2 25
3-inch	2 50	3½-inch	3 00
4-inch	3 50	4½-inch	4 00

Sheet Iron Bread Pans........₩ ℔ 12c
American Broilers........₩ doz, $13 50
Tinmen's Machines........net list
Sad Irons........₩ ℔, 5½c
Brass Kettles.—Ansonia........48c



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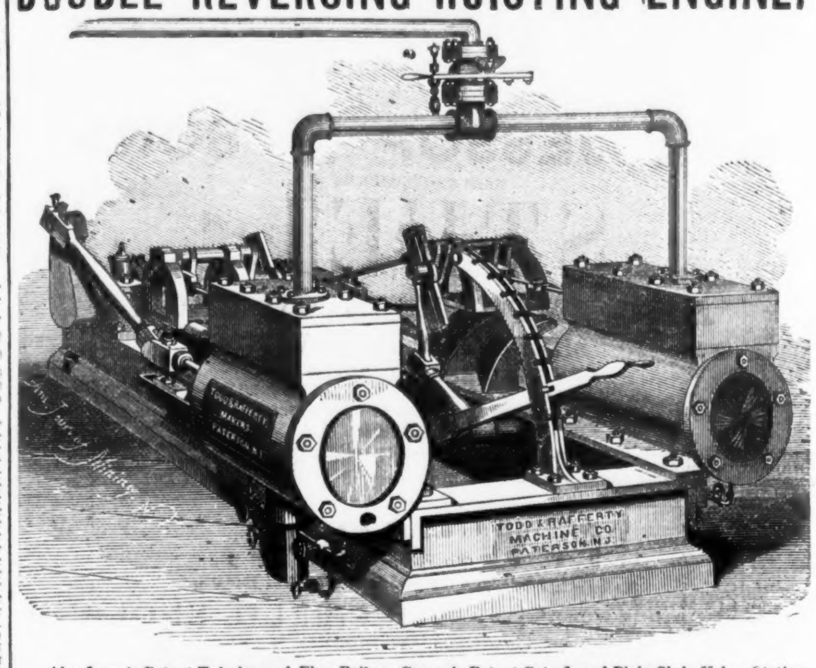

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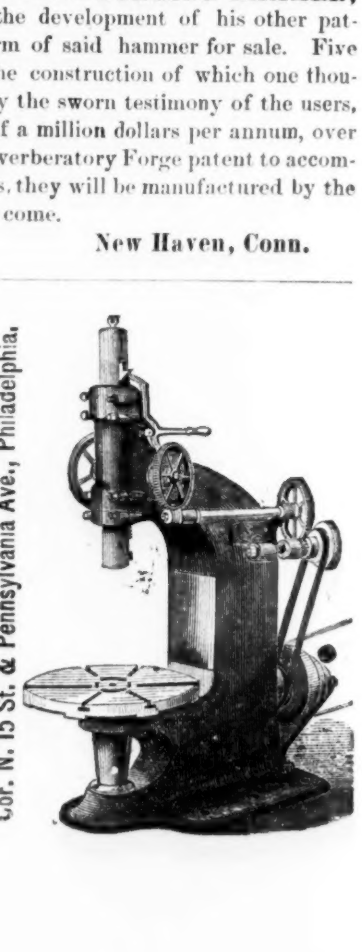

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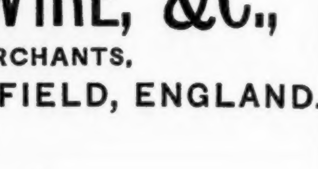

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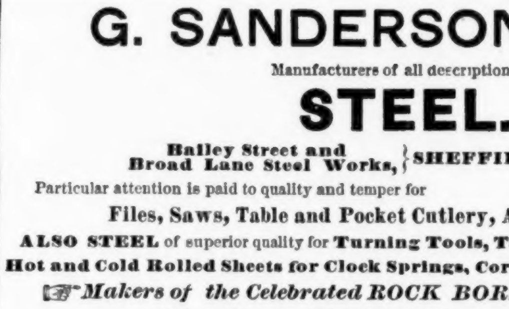

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IN EVERY PART OF THE UNITED STATES, from having agencies and magazines at all prominent points, beside our works at **Newburg, Saugerties, Kingston, and Catskill, N. Y.; Scranton, Carbondale and Pottsville, Pa.; Baltimore, Md., and Platteville, Wis.**

The superiority is well known of our brands Rifle Powder:

Orange Rifle, Orange Ducking, Lightning, Audubon.

SAFETY-FUSE at wholesale.

Steel.

HUSSEY, WELLS & CO.

MANUFACTURERS OF ALL DESCRIPTIONS OF

CAST STEEL,

INCLUDING

Best Refined Steel for Edge Tools.

PARTICULAR ATTENTION PAID TO THE MANUFACTURE OF STEEL FOR

Railroad Supplies, Homogeneous Plates

FOR LOCOMOTIVES, BOILERS AND FIRE BOXES,

Smoke-Stack Steel, Cast Steel Forgings for Crank Pins, Car Axles, &c.

ALSO, MANUFACTURERS OF THE CELEBRATED BRAND

"Hussey, Wells & Co. Cast Spring Steel,"

For Elliptic Springs for Railroad Cars & Locomotives.

PENN AND SEVENTEENTH STS., PITTSBURGH, PA.

BRANCH OFFICES:

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Pittsburgh Steel Works.

ESTABLISHED IN 1845.

ANDERSON & WOODS,

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BEST REFINED CAST STEEL,

Cast and German Plow and Spring Steel,

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W. F. POTTS, SON & CO., 1225 Market Street, Philadelphia.

CHROME STEEL COMPANY,

MANUFACTURERS OF

CHROME CAST STEEL,

WARRANTED SUPERIOR TO ANY STEEL IN THE MARKET—EITHER ENGLISH OR AMERICAN—FOR EVERY PURPOSE.

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Principal Agencies:

Hall, Kimbark & Co., Chicago, Ills. Harris, Rice & Co., St. Louis, Mo. Horace P. Tobey, Boston, Mass. Cleveland, Brown & Co., Cleveland, Ohio. Wood & Leggat, Hamilton, Ont.

LABELLE STEEL WORKS!

REITER, LAVELY & CO.,

MANUFACTURERS OF ALL KINDS OF

STEEL.

Also, Springs, Axles, Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.

Post Office Address, Pittsburgh, Pa.

FORT PITT STEEL WORKS

PITTSBURGH, PA.

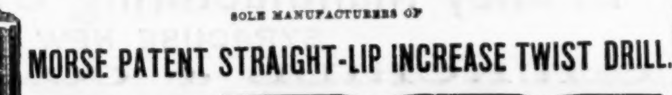
Reese. Graff & Woods.

Morse Twist Drill and Machine Company,

New Bedford, Mass.,

SOLE MANUFACTURERS OF

MORSE PATENT STRAIGHT-LIP INCREASE TWIST DRILL.



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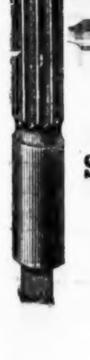
ALSO MANUFACTURE

SOLID AND SHELL REAMERS.

All Tools exact to Whitworth's Standard Gauge.

DRILLS MADE TO FIT ANY SOCKET DESIRED.

EDWARD S. TABER, Treasurer.



CHICAGO.

(Reported by Markley, Alling & Co.)

Agricultural Implements.—
Scythes—Dunn Edge Tool Co. ... dis 30 %
Hay and Manure Forks—Otsego extra C. S. ... dis 30 %
Hoes and Garden Rakes—Jackson and Otsego ... dis 30 %
Scythe Stones ... dis 25 %
Scythe and Bush Snathes ... dis 25 %
Harvest Rakes and Barley Forks ... dis 25 %
Revolving Horse Rakes ... dis 25 %
Handles—Fork and Shovel ... dis 25 %
Cradles—Xithington, Cooley & Co. ... dis 45 %
—Genuine Morgan ... ₩ doz net $34 00

Augers and Bits.—
Ives' extra C. S. ... dis 30 % | Snell's ... dis 10 %
Jennings' ... dis 5 % | " Car Bits ... dis 10 %
Cook's ... dis 30 %

Axes.—Amoskeag Yankee ... ₩ doz $13 50
Amoskeag Crescent ... " 14 00
Hunt's Yankee ... " 14 00
Kennebeck Yankee ... " 12 00
Lippincott ... " 13 00
" Crown ... " 13 00
" Beveled ... " 14 50
Jefford's Silver Steel ... " 13 00
Red Warrior, Beveled ... " 14 00
Kennebeck, Handled ... " 15 00
Boy's, Handled ... " 12 00

Bolts.—Carriage and Tire ... dis 75 %
Cast Barrel and Shutter ... dis 20&10 %
Wrought Iron Barrel ... add 10 %
" " Square ... net list

Butts.—Cast Fast Joint, Narrow ... dis 30 %
Cast Fast Joint, Broad ... dis 30 %
" Loose Joint ... dis 35 %
" " Pin, Reversible ... dis 35 %
" Japanned ... dis 35 %
" Silver Tipped ... dis 35 %
Wrought Narrow, Fast Joint ... dis 30 %
" Broad " " ... dis 30 %
" " Loose " ... dis 37 %
" Loose Pin ... dis 30 %
" Table ... dis 30 %
" Brass ... dis 10 %
Garretson's Blind Butts, Wood ... doz sets $1 75
" " Brick ... doz sets 2 00
Parker's " Wood ... doz sets 1 85
" " Brick ... doz sets 2 25

Casters.—Iron Plate ... dis 25 %
Brass Wheel Plate ... dis 25 %
Porcelain Wheel Plate ... dis 25 %
" " Bed ... dis 25 %
Iron Wheel Bed ... dis 25 %

Chisels.—Butcher's Tanged Firmer ... dis 33 %
" Long Paring ... dis 33 %
Witherby Socket Framing ... dis 50&20 %
" " Firmer ... dis 50&20 %
" " Corner ... dis 50&20 %
" " Slicks ... dis 50&20 %

Coffee Mills.

Box 4 Iron	$3 75	Box 85 Cast Steel	$12 00
" 100	5 25	Side 50	4 75
" 102	6 25	" 60	5 75
" 107 Britannia	7 50	" 70	7 25
" 106	8 50	" 90	18 00
" 25 Union	10 50	" 15 Union	7 00
" 35 "	14 00	" 20 "	8 00
" 75 Cast Steel	10 50		

Cutlery.—American Table ... dis 20 %
" Pocket ... dis 25 %

Door Springs.—Torry ... ₩ doz $5 50
Rubber ... " 4 00
Boon's ... " 5 00

Drawing Knives.—Witherby Tool Co. ... dis 50&20 %
Ohio Tool Co. ... net list

Files.—Butcher's ... $7 00 £
Nicholson's ... $5 00 @ $5 50 £

Hammers.— | Yerkes & Plumb ... net list
Maydole's ... net list | Cheney ... net list

Handles.
Extra Axe ... ₩ doz. $3 00 | Coal Pick, No. 1 ... ₩ doz $2 00
No. 1 Axe ... " 2 25 | Sledge, No. 1 ... " 2 00
No. 2 Axe ... " 2 00 | Hatchet ... " 65
R.R. Pick, No. 1 " 2 00 | Hammer, A. E. ... " 65

Hatchets.— 1 2 3
Amoskeag Shingling ... $7 25 8 00 $8 75
" Claw ... 7 75 8 50 9 25
" Lath ... 7 50 8 25
" Solid Steel ... 12 00

Hinges.—Strap and T ... dis 25&7½ %
Screw Hook and Strap, 8 to 12 in ... net, 9c. ₩ lb
" 14 to 24 in ... net, 7½c. ₩ lb
Hook and Eye Hinges ... net 12c. @ 16c. ₩ lb
Gate, No. 35, State ... ₩ doz $3 50
" No. 3, In and Out ... " 3 50
" Blinn's Pat ... " 7 50

Horse Nails.—Northwestern, 8d ... 24c
Ausable, 8d ... 25c
Globe, 8d ... 26c

Kettles.—Brass ... 50c | Enameled ... dis 15 %

Locks and Knobs.— | EagleLock Co. ... dis 15 %
Norwalk Lock Co. dis | Am. Pad Locks ... dis 25 %
Branford " dis | Cont'al Lock Co. ... dis 30 %

Meat Cutters.— | Woodruff Patent ... net list
Haven's Patent ... net list | Stowe's Sausage
Hale's ... dis 10 % | Stuffers ... net list

Molasses Gates.— | Enterprise Patent ... dis 5 %
Stebbin's Patent ... dis 50 %

Nails.—10d to 60d ... per keg $4 25 @ 4 37½

Oil Stones.—Washita No. 1 ... net 30c ₩ lb
Washita Slips ... net 40c "
Hindostan No. 1 ... net 9c "
" Axe ... net 10c "
" Slips ... net 15c "

Picks and Mattocks.—Picks, Railroad,
Axe Finish ... ₩ doz $12 00
Picks, Coal, Axe Finish ... " 13 00
Mattocks, L. C., Axe Finish ... " 13 50
" S. C., " ... " 14 50
Grub Hoes, Axe Finish, No. 2 ... " 13 00

Planes.—Ohio Tool Co., Bench ... dis 25 %
Sciota ... dis 30 %
A. Howland & Co., Bench ... dis 25 %
" Fancy ... dis 25 %
Bailey Patent Iron ... dis 15 %
Plane Irons, Butcher's ... dis 25 %

Rivets.—Iron ... dis 10 @ 15 % | Copper, No. 7, net, ₩ lb, 55c
Tinned ... dis 10 @ 15 % |

Rules.—Stanley Rule and Level Co. ... dis 50&10 %
Hubbard & Curtiss Mfg. Co. ... dis 50&10 %

Sad Irons.—Best A No. 1 ... ₩ lb, 4c
" Copper Face Star ... ₩ lb, 4½c

Sandpaper.
Baeder & Adamson's No. 0 to 1½ ... per ream, net $4 50
" No. 2 to 3 ... " 5 00
Wiggin & Stevens, No. 0 to 1½ ... ₩ ream, net $4 50
" No. 2 to 3 ... " 5 00

Sash Locks.—Champion ... ₩ gross, net, $12 00
Hopkins & Dickinson ... dis 10 %
Judd's Patent ... dis 10 %
Corbin's Patent ... dis 10 %
Clark's Patent ... dis 10 %

Saws.—H. Disston & Sons ... dis 10 %
Champion X Cut ... ₩ foot, net, 60c
M. A. & Co. X Cut ... " 56c
Lightning Cut ... " 66c

Screws.—American Screw Co.—Iron ... new list dis 50 %
American Screw Co.—Brass ... dis 50 %

Shovels and Spades.
Ames' Black Shovels ... ₩ doz $14 50
" Polished " ... " 16 00
" Patent " ... " 18 00
Alling " ... " 14 00
" Molders' ... " 16 00
Crane's Black " ... " 13 50
" Polished " ... " 15 00
Smith's " B. S. L. H. Rd. Pt. ... " 13 50
" " B. S. D. H. Rd. Pt. ... " 13 50
Ames' Black Spades ... " 15 00
" Polished " ... " 17 00
" Patent " ... " 18 00
Alling " ... " 15 00
Crane's Black " ... " 14 00
" Polish'd " ... " 16 00

Scoops.—Alling Steel Polished, No. 2 ... ₩ doz, $13 50
Alling Steeled Polished, No. 3 ... " 14 00
" " No. 4 ... " 14 00
" " No. 5 ... " 15 00
" " No. 6 ... " 16 00
" " No. 7 ... " 17 00
" " No. 8 ... " 17 50
" " No. 10 ... " 18 00
Crane's Polished, No. 5 ... " 16 00
" No. 6 ... " 16 50
" No. 7 ... " 17 00
" No. 8 ... " 17 50
Crane's Black Coal, No. 4 ... " 17 00
" No. 5 ... " 17 50
Preston, Black Scoops No. 1 ... " 13 50
" " No. 2 ... " 15 00
" " No. 3 ... " 16 50
Half Pol. Scoops No. 1 ... " 14 00
" " No. 2 ... " 16 00
" " No. 3 ... " 18 00
Lippincott, Half Pol. No. 2 ... " 15 00

Wrenches.—Taft's ... dis 60 %
Coe's Imitation ... dis 60 %
Coe's Genuine ... dis 30 %

Wringers.—Novelty Clothes Wringer ... ₩ doz $69 00
Universal Clothes Wringer ... " 72 00

Chicago Metal Market.

(Reported by Cragin Bros. & Chandler, 141, 143, and 145 Lake St.)

Tin Plate.—

IC, 20x14, Coke	$12 50	IXX, 14x20, Charcoal	20 00
IC, 10x14, Charcoal	13 50	IXXXX, 14x20, "	23 50
IX, 10x14 "	16 50	IX, 14x14, "	27 50
IC, 12x12 "	14 00	DC, 100 Plate, "	13 00
IX, 12x12, "	17 00	DX, "	17 00
IC, 14x20, "	14 00	DXX, "	19 00
IX, 14x20, "	17 50	DXXX, "	21 00

IC, 14x20, Coke Roofing			
IC, 20x28 Coke, for Gutters			20 00
IC, 14x20, Charcoal Roofing			13 00
IX, 14x20 " "			16 00
IC, 20x28, "			26 00
IX, 20x28, "			31 00

Pig Tin.— | Small, 30 lb ... 38c
Large, 60 lb ... 38c | Bar Tin ... 40c

Zinc.—
In casks 1000 lb ... c | In sheets ... 11 c
" 500 " ... 10 c | Slab ... 9c

Copper.—Copper Bottoms ... 37c
Sheathing Copper ... 36c
Planished Copper ... 41c
" " cut to lengths ... 43c

Braziers' Sheets, 30x | 15 to 100 lbs ... 40c
60.—6 to 8 lbs ... 46c | Ingot Copper ...
10 and 12 lbs ... 42c | Bolt ... 45c

Solder.—Extra Fine, C. | Ordinary, No. ... 21c
B. & Co.'s Brand ... 25c | Plumbers' Solder ... 23c
Fine, No. 1 ... 23c | Braz'rs' or Spelt'r Solder 35c

Antimony ... 20c

Babbit Metal ... 15c @ 25c.

Galvanized Iron Conductor Pipe ... ₩ lb 10c

Sheet Iron. Common. Smooth. Charcoal.
No. 14 to 24 ... 5½c 6¼c 8¼c
" 25 & 26 ... 5¾c 6½c 8¾c
" 27 ... 6¼c 7½c 9 c
Add ½c ₩ lb for 30 in. wide.

Galvanized Iron. ... dis 15 %
No. 16 to 20 ... 15c | No. 27 ... 15c
" 22 to 24 ... 15c | " 28 ... 16c
" 25 & 26 ... 15c |

Russia Iron.— | No. 1 Stained ... 20c
Perfect ... 22c | In sheets, 1c higher.

American Russia.— ... 11c
A ... 11c | In sheets, 1c higher.

Lead.— | Lead Pipe, in full coils 10½c
Pig ... 8½c | Lead Pipe, when cut, 11c
Bar ... 10c | Sheet Lead ... 10½c

BOSTON.

(Reported by Macomber, Bigelow & Dowse, 42 to 48 Batterymarch St.)

Anvils.—Eagle, ₩ lb 11c. currency ... dis 15 @ 15&5 %

Axes.—Forester's Favorite, Bronzed ... $13 00
Blue Jackets, nine ... 12 50
Chopper's Pride, Bronzed ... 11 00
Red Cross, Bled ... 10 50
Red Cross, Handled ... 13 50
Boy's Handled Blue Jackets ... 12 00
Hunts Axes ... ₩ doz $15 @ 17 50 net @ 5 %
" Hatchets ... net
Shingling Nos. 1, 2, 3 ... ₩ doz $7 25 8 00 8 75
Claw " 1, 2, 3 ... 7 75 8 50 9 25
Lathing " 1, 2, 3 ... 7 50 8 25 9 00

Axe Handles.—Hickory, Fisher Pat. No. 1 ₩ doz $2 75
Hickory, Fisher Pattern ... " 2 00
Oak, " " ... " 1 " 2 75
" " " ... " 2 " 2 00
" " " ... " 3 " 1 50

Bells.—Hand ... dis 60&10 %

Bolts.—Carriage, Phila., " Girard Works ... dis 50 %

Borers.—Angle, Backus ... dis 30 %

Boring Machines.—Angle ... each $4 75
Common, Snell's quality ... each 3 75

Breast Drills.—Miller's Falls, $30 per doz ... dis 25 %

Braces.—Barber's ... dis 40 %
Backus ... dis 50 %
Spofford's ... dis 40 %

Butts.—Union Drilled Loose Joint ... dis 50 %
" " Acorn Loose Joint ... dis 30 %
" " Fast Narrow ... dis 50 %
Brass Butts ... dis 30 %
Wrought Table Butts and Back Flaps ... dis 30 %
Wrought Narrow Butts ... dis 30 %

Carriage Jacks.—Young America ... ₩ doz $21 00

Cartridges.—U. S. Cartridge Co. ... dis 50 %

Chisels.
Socket Framing M. B. & D's, warranted ... dis 50&10 %

Cordage.—Manila ... ₩ lb, 16½c
American Tarred Hemp Lath Yarn ... ₩ lb, 10c

Cow Ties.—
No. 30, open ring, 3 ft., No. 6, with toggle ... ₩ doz $3 37
No. 35 " 3 ft., No. 5 " snap ... " 3 62
No. 40 " 3½ ft., No. 5 " toggle ... " 3 75
No. 45 " 3½ ft., No. 4 " toggle ... " 4 00
No. 50 " 4 ft., No. 4 " toggle ... " 4 25
No. 55 " 4 ft., No. 4 " snap ... " 4 50
No. 60 " 4 ft., No. 3 " toggle ... " 4 50
No. 65 " 4½ ft., No. 3 " snap ... " 5 00

Crow Bars.—Iron, Steel Points ... ₩ lb, 5½c

Door Springs.—Stimson's Patent.—
No. 7, Light inside doors, $12'00 ... dis 25 %
No. 8, " outside " $18'00 ... dis 25 %
Torrey's ... $4'00

Files.—Earl Smith & Co.'s English ... $5 to £ gold
American ... $5 to £ currency, less 10 %
Nicholson ... $5 to £ currency, less 10 %

Funnel Irons.—$2'50 $2'50 $2'75 $3'25 per doz
3 4 5 6 7 inch
Deep Flange, $3'50 $3'75 $4'00 per doz
5 5½ 6 inch

Hammers.—Maydole ... dis 5 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $'75
" " " " bell face, No. 1,
$11; 1½, $9'75.

Hangers & Rollers.—Novelty ... dis 30 %

Hatchets.—Underhill Edge Tool Co. ... dis 10 %
Underhill pattern, solid, C. S. lathing ... $9 50

Hinges.—Strap and T, Stanley Works ... dis 25&7½ %
Wrought Screw Hook ... ₩ lb 8c

Locks.—P. & F. Corbin ... new list dis 50&5 %

Mattocks.—R. C. Co. axe finish, sugar cutter ... $13 75
Short cutter ... 13 50

Meat Cutters.—"Miles" ... dis 20 %
No. 1, $22; No. 2, $30; No. 3, $40 per doz.
American, $6 each ... dis 25 %

Nails.—Rubbit, No. 1, 25c; 2, 25c; 3, 16c; 4, 15c ₩ lb

Nails.—10d and larger ... $4 25

Paper.—Finest Quality Manila ... ₩ lb 11c

Parers.—Reading, New Pattern ... per doz $8 00
Turn Table ... per doz 8 50

Picks.—K. F. & Co., Polished Points—
5 to 6 ... per doz $10 00; 6 to 7, $10 50

Pulleys.—Clark & Co.'s Axle, 1½ in.
... per doz 37c.; 2 in., 42c

Plated Ware.—Rogers Bros ... new list dis 30 %

Plumb & Levels.—"Davis" Pat. Adjust. dis 50&10 %
"Davis" Pat. Adjustable Inclinometer, wood and iron ... dis 33⅓ %

Pocket Knives.—Conn. Cutlery Co ... new net list

Rivets.—Black ... dis 25 %
Carriage, oval head, Nos. 5, 4, 5, 6, 8,
13 13 14 14 15 16c ₩ lb net

Sad Irons.—Reading ... ₩ lb 4½

Sand Paper.—0 to 1, $2 25; 2 to 3, $4'75 ... dis 10 %

Saws.—Disston's ... dis 12½ %
Lightning X cut, Boynton's ... per foot 6½c
" Saw Blades, 32 inch ... per doz $7 00
" Framed Saws ... per doz $9 00
Common ... per doz 6 00
Diston ... per doz 9 00
One man X cut—Lightning ... $2 75 each
Disston's $2'00 each ... dis 12½ %

Scythe Stones.—
"Willoughby Lake," first quality ... ₩ gross $6'50
" second quality ... 3'00

Saw Clamps.—Reading ... $11'25

Screws.—American Screw Co ... new list dis 52½ %

Shovels.—O. Ames ... new list dis 12½ %
M. B. & D. ... new list dis 12½ %
Snow, malleable iron tip, D handle ... $6'50
" plain ... 5'50
Carr's Iron, Black Strap ... Black, $6'50; Polished, $6'50

Sifters, Coal.—McMasters ... $8'00
Collins, C. S. ... $12'00

Sinks.—Cast Iron, 2, 2½, 3, 3½, 4, 4½ feet.
$1'37 $1'62 $2'25 $2'25 $3'75 $4'75 each.

Tools.—Aiken's Pattern, 20 in set; Miller's Falls,
$12'00 per doz ... dis 15 %

Traps.—Oneida ... dis 20 %
Blake's ... dis 20&5 %

Vises.—K. F. & Co.'s Solid Box, Blacksmith ... ₩ lb 14½c
Parker's Parallel ... dis 10 %
Backus ... dis 25 %
"Howards," Parallel ... dis 15 %
Fisher & Norris' Double Screw Paral'l ... dis 15 @ 15&5 %

Weights.—Window Weights ... ₩ lb 2½c

Wrenches.—Coe's Genuine Wrenches ... dis 40 %

Wringers.
" Novelty ... less than 5 doz ... ₩ doz $ 72 00
and Tub No. 2 ... 5 doz ... ₩ doz 69 00
" Universal ... 10 doz ... ₩ doz 67 00
Monitor, Double Cogs ... ₩ doz 66 00
" Novelty Bench, No. 4 ... less than 5 doz ... ₩ doz 108 00
" 5 doz ... ₩ doz 104 00
" 10 doz ... ₩ doz 101 00

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz.)

Tin Plates.—₩ box
I. C. Char. 10x14 ... $13 50 | Char. Roof. I C. 10x14 $12 00
I. C. Coke " ... 12 00 | Coke " I C. 10x14 11 00

Pig Tin.— | Straits ... 32c
Banca ... 35c | English ... 32c

Copper.— | Bolt ... 35c
Sheathing ... 35c | Ingot ... 36c

Lead.— | Sheet and Pipe ... 9c
Pig ...

Spelter ... ₩ lb 9½c

Zinc.—Sheet ... 10½c

Antimony ... 16c

Iron.—Sheet Iron, Russia ... 20c
Sheet Iron, English ... 6½c
" " American Refined ... 8½c
" " Galvanized ... 11½c
Plate Iron ... 4½

Swedish and Norway Bar Iron, gold ... ₩ ton, $137 50
" " " Shapes, gold ... 147 50
Norway Nail Rods, first quality, gold ... 165 00
" " second " ... 150 00
Best Refined Bar Iron ... 75 00
The "Burden Best" Iron ... 112 00
American Pig Iron, Foundry, No. 1, x ... 38 50
" " No. 2, x ... 36 50
" " Gray Forge ... 33 50
Scotch Pig Iron ... ₩ ton 46 00 @ 51 00
Wrought Scrap Iron ... 45 00

Steel.— | German ... 11c
Jessop's Tool, C.S. ... 25c | Spring ... 8½c
American Tool ... 15½c | Tire ... 7½c
" Machinery ... 13c | Sleigh Shoe ... 5½c
Bessemer ... 7½c | Toe Calk ... 8½c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Anvils.—Armitage ... ₩ lb, gold, 15c
Peter Wright's ... " 14c
Wilkinson's ... " 12½c

Apple Parers.—Conqueror ... ₩ doz, $9
Lightning ... " 9
Turn Table ... " 9 00

Augers and Bits.—Cook's ... dis 25 %
Ives ... dis 20 %
Jennings ... dis 5 %
Snell's ... dis 12½ %

Axes.—Hunt's ... ₩ doz $14 00 @ 15 00
Lippincott's ... " 13 00 @ 14 00
Lippincott's Pioneer ... " 13 50 @ 14 50
Simmons' ... " 13 00 @ 13 50

Axles.—Kritch & Crane Mfg. Co.'s—
Patent Taper Axles ... new list net
Swelled Taper Axles ... new list net
Concord Axles ... new list net
Red Jacket Axles ... new list net
Common Axles, 1½ inch and upward ... ₩ lb, 8¼c
" " less than 1½ inch ... " 9¼c

Bellows.—"Best St. Louis make" 60c ₩ in. dis 20 %

Bells.—Troy, Church ... ₩ lb, 50
Light Brass, Hand ... dis 50 %
Moore's, Cow ... dis 70 %

Bolts.—Arms, Bell & Co.'s Machine ... dis 20 %
Arms, Bell & Co.'s Carriage and Tire ... dis 70&15 %
Cast Iron Barrel, Shutter, &c. ... dis 25 %

Cast Butt Hinges.—Narrow Fast Joint ... dis 33 %
Broad Fast Joint ... dis 40 %
" Loose " ... dis 50 %
Reversible ... dis 45 %
" Japanned and Silver Tipped ... dis 45 %
Loose Joint "Acorn" " " ... dis 40 %
Excelsior Reversible Blind ... dis 30&10 %
Lull & Porter's Blind ... dis 45 %

Wrought Butts.—Narrow ... dis 20 %
Reversible ... dis 25 %
Broad ... dis 25 %
Table Hinges ... net list
Back Flaps ... net list
Inside Blind Hinges ... net list

Chain.—Eng. Coil. 3-16 ¼ 5-16 ⅜ 7-16 ½ in.
13 11 10 9½ 9 8c gold
Trace ... 6½-10-2 70c "
7-10-2 75c "
German Coil and Halter ... revised list add 10 %

Chisels.—Socket, Firmer or Framing ... dis 55 %

Clothes Wringers.—Crown ... ₩ doz $60 00
Novelty ... " 72 00
Universal ... " 72 00
Monitor ... " 72 00

Corn Knives.—Dunn Edge Tool Co.'s Clip ... ₩ doz $5 75
Disston's ... " 6 00

Crow Bars.—Steel Pointed ... ₩ lb 7 @ 9c
Solid Cast Steel ... 20c

Cutlery.—J. Russell & Co.'s ... } new list, dis 15 %
Lamson, Goodnow & Co.'s ... }
Landers, Frary & Clark's ... }

Files and Rasps.—
Nicholson's Mill Files ... $5 50 to the £, currency
Nicholson's Other Files ... 5 00 to the £, currency
Butcher's Mill ... 6 75 to the £, currency
Heller's & Bros Horse Rasps ... 5 25 to the £, currency

Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks ... dis 30 %
" " Handled Hoes ... dis 30 %
" " Planter Eye Hoes ... net list
Winsted's Planter Eye Hoes ... net list

Hammers.—Yerkes & Plumb ... new list net
Masons' Hammers ... ₩ lb 20c
Smith Hand Hammers ... " 22c

Handles.—Axe ... Extra. No. 1. No. 2. No. 3
$2'75 $2'25 $1'75 $1'00
Pick ... Extra. No. 1. No. 1½. No. 2.
$2'50 $2'00 $1'75 $1'25
Smith & Montross Fork, Hoe and Rake ... dis 20 %
" " Broom and Mop ... $12 @ $18 ₩ M.

Harrow Teeth.—1 inch iron ... ₩ lb 4½
⅞ and ¾ inch iron ... " 4¾
⅝ inch iron ... " 5
Barbed or Headed ... ½c extra

Hatchets.—Hunt's ... net list
Simmons' ... dis 10 %

Hay Knives.—Lightning ... ₩ doz $22
Dunn Edge Tool Co.'s ... ₩ doz $14 50—dis 15 %
Fisher's ... " 16 50—dis 10 %

Hinges.—Strap and T—St. Louis make ... dis 25 %

Horse Nails.—Eureka ... 23c rate
Ausable ... 22c "
Northwestern ... 22c "
Eagle ... 19c "
National Patent Pointed ... 21c "
" " " Extra Finished ... 22c "

Horse Shoes.—R. I. (Perkin's pat.) ... ₩ keg $6 25
Burden's ... " 6 25
Mule Shoes ... " 7 25
Rhode Island Trotting Shoes ... " 8 75

Locks and Latches.—
Jones & Nimick's ... revised list dis 40 %
Moorhead, Adams & Co. ... revised list dis 40 %
Norwalk Lock Co.'s ... revised list dis 40 %

Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks ... ₩ doz. $15 00 @ 16 00
" Grub Hoes, Oval Eye ... ₩ doz. 12 00 @ 13 00

Nails.—Wheeling ... $4 35 rates
Orders for 100 kegs 10c ₩ keg less.

Picks.—Klein, Logan & Co.'s R. R. and Clay ₩ doz. $12 00
Klein, Logan & Co.'s Coal ... " 9 75
" " Poll ... " 12 00
" " Stone ... " 16 50
" " Tamping ... " 19 00

Planes.—Ohio Tool Co.'s ... dis 20 %
Sciota ... dis 25 %

Post Hole Augers.—Clark's Patent—
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32 ... dis 20 %
Barton's Patent ... ₩ doz $25—dis 20 %
Vaughn's " ... 25—dis 10 %

Sad Irons.—Monitor Brand, Silver Polished ... ₩ lb 5c

Sash Weights.—Standard Solid Eyes ... ₩ lb 3½c

Saws.—Disston's ... dis 10 %
Spear & Jackson's ... $5 00 to £ gold
Hubbard, Lippincott, B. & Co.'s ... dis 10 %
Branch, Crooks & Co.'s ... dis 10 %
Livingston's Patent Buck ... net list

Screws.—American Screw Co.'s revised list ... dis 45 %
$2000 worth in 6 months ... 2½ % extra

Scythes.—Blood's C. S. & G. S. ... net list
Dunn Edge Tool Co.'s ... new list dis 25 %
Paris Furnace Co.'s ... dis 25 %
Waldron's English ... $10 00 to £

Scythe Stones.—No. 1 Ind'n Pond ₩ gr's, $7 00 }
Extra Indian Pond ... " 7 50 } dis 25 %
Premium ... " 9 50 }
Diamond Grit ... " 13 50 }

Shovels, Spades and Scoops.—
Ames' ... revised list dis 5 %
Lippincott's ... new list dis 10&5 %
Rowland's, Maxwell ... revised list dis 12½ %

Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished ... ₩ lb, 17c
Solid Cast Steel ... " 35c
Striking Sledges ... ₩ lb extra, 1c

Snaths and Cradles ... dis 25 %

Springs.—Cleveland Spring Co.'s—
Carriage and Express ... dis 5 %
Blue Seat Springs ... new list dis 10 %

Tacks.—Norway Tack Co.'s ½ weight ... dis 70 %
Brads ... dis 50 %

Thimble Skeins.—Pump & Skein Co.'s ... dis 50&5 %

Traps.—Newhouse Patent ... dis 15 %

Vises.—Solid Box ... ₩ lb 16c
Wilson Mfg. Co.'s ... dis 15 %

Wrenches.—Coes' Genuine ... dis 30 %
Coes' Pattern ... dis 40 %
Taft's ... dis 50 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.

Tin Plate.

IC, 10x14, Charcoal	$13 50	IC, continuous, 20 in. x 200 ft.	
IX, 10x14, "	16 50	IX, continuous, 20 in. x 200 ft.	
IC, 12x12, "	14 00	IC, 10x14, best Coke	$12 50
IX, 12x12, "	17 00	IC, 10x14, good "	12 00
IC, 14x20, "	14 50	IC, 10x20	20 00
IX, 14x20, "	17 50	IC, 14x20	12 00
IC, 14x20, Terne	13 00	IC, 14x20, Coke Lead	12 00
IX, 14x20, "	16 00		
IC, 20x28, "	26 00		
IX 20x28, Terne	31 00		

Block Tin.
Large Pigs ... 38c | Bars ... 40c
Small " ... 38c |

Sheet Zinc.
Casks ... ₩ lb 10 c | Sheet ... ₩ lb 11c

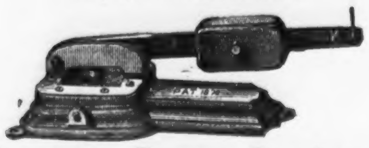
Solder.
No. 1, Refined, in bars or plate ... 25c
No. 2, " " " ... 23c
Pig Lead ... 8½c

Sheet Copper.—18 to 100 lbs. Sheets 30x60 ... 35c
14 to 16 lbs., Sheets 30x60 ... 35c
10 to 12 lbs., " and 30x72 ... 38c
6 to 9 lbs., " ... 41c
Tinned, 14 and 16 oz. 14x48 ... 39c
Planished, 14 and 16 oz. 14x48 ... 41c
" No. 7, 8 and 9 ... 48c
Copper Bottoms ... 37c

Sheet Iron.— Com'n. Sm'th. Char'l. Junia.
No. 16 to 20 ... 5¾c 6c 8¼c 10½c
No. 22 to 24 ... 5¾c 6c 8½c 10½c
No. 26 ... 6c 6¼c 8¾c 10½c
No. 27 ... 6¼c 6½c 8¾c 10½c

Galvanized Iron ... dis 15 %
Iron Rivets ... dis 15 %
Iron Wire ... dis 30 %
Coppered Market Wire ... dis 25 %
Copper Rivets and Burs ... dis 10 %
Russia Iron.—Nos. 9, 10, 11 and 12, ₩ lb ... 21c @ 22c
No. 1, stained, ₩ lb ... 20c
Imitation Russia, ₩ lb ... 14

IMPROVED GAGE COCKS
Simple, Durable and Efficient.



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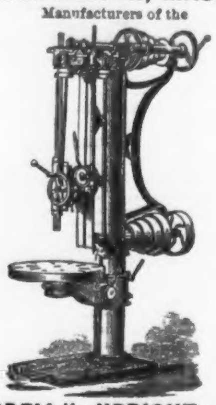

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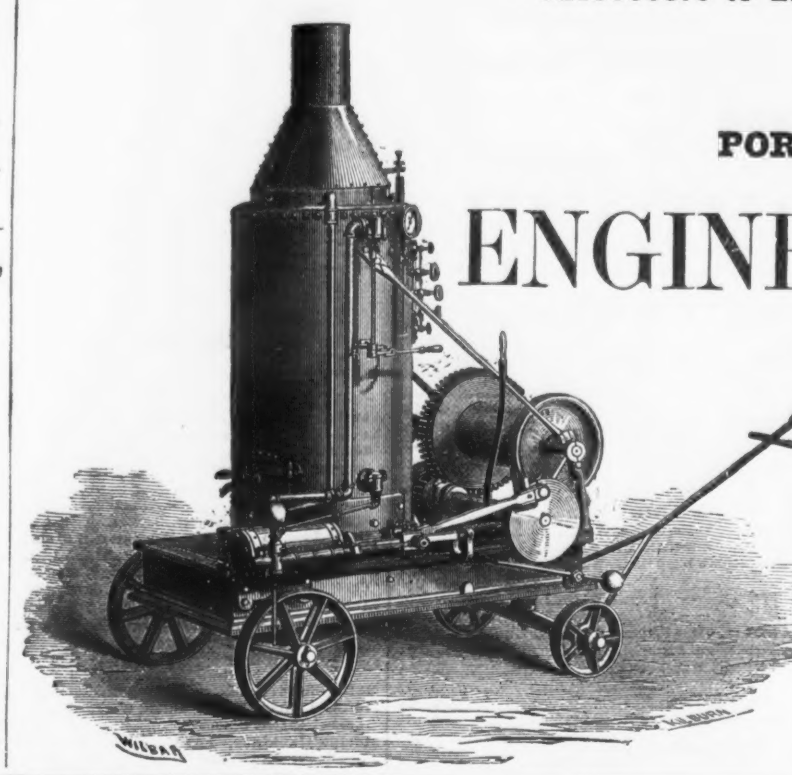

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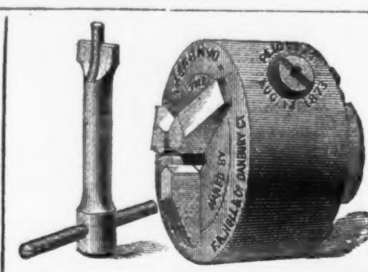

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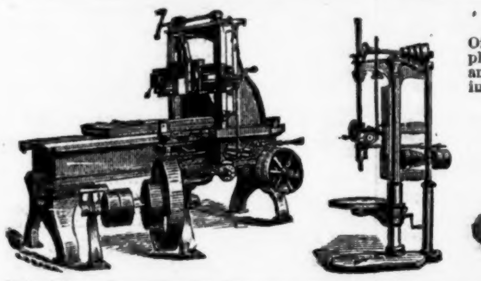
C. H. Reid's Patent, Aug. 12th, 1873



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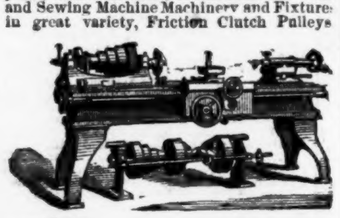

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DIRECT ACTION STEAM PUMP,

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Tank Pump, with Boiler Feed Attachment.

For Boiler Feeders,
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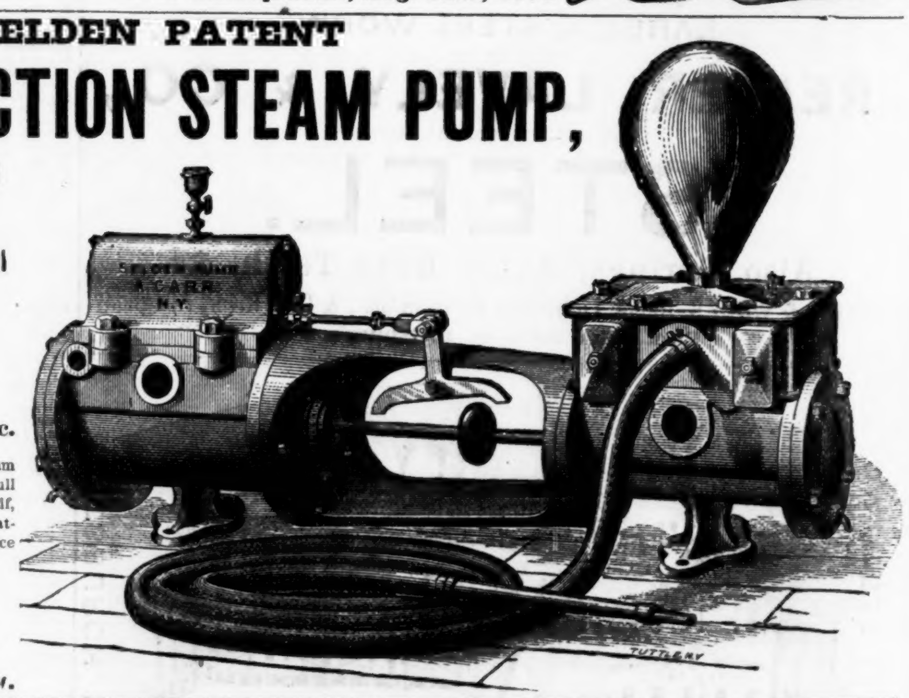

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JACKS for Pressing on Car Wheels or CRANK PINS made to order.

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Without BELTS or BELLOWS.
It is more Easily Worked, gives a Better Blast, and is the Cheapest forge made, and
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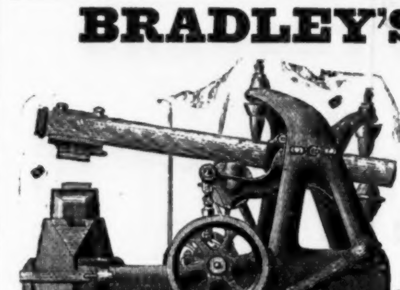

This Hammer has many valuable improvements made useful in the device for cushioning the blow, thereby relieving all the working parts from that jar and concussion which is the destroying element of other Helve Hammers. It is made Adjustable in Line of Action, Length of Stroke, Rapidity of Motion, and Weight of Blow, all of which are controlled at the will of the operator. They have ***Larger Capacity, Cost Less,*** are more ***Durable,*** take up ***Less Room,*** do ***More*** and ***Better Work*** at ***Less Expense*** for Power, than any other Hammer in use. We guarantee them fully as recommended. For particulars, address

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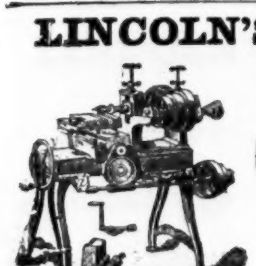

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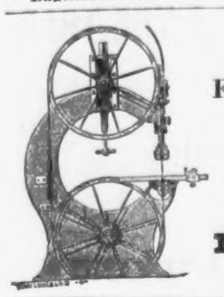

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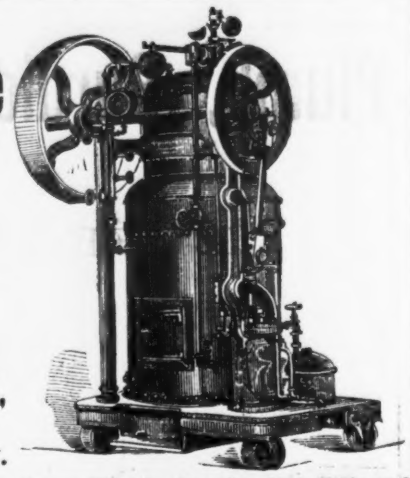

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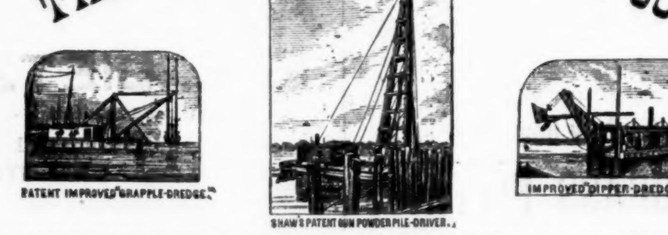

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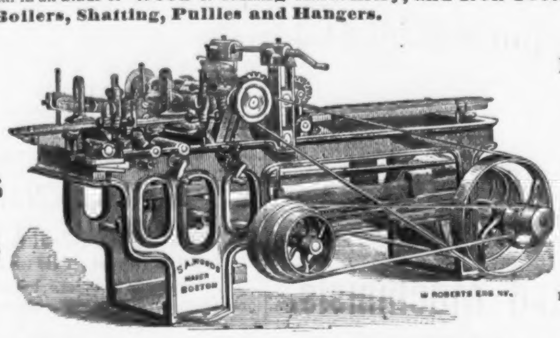

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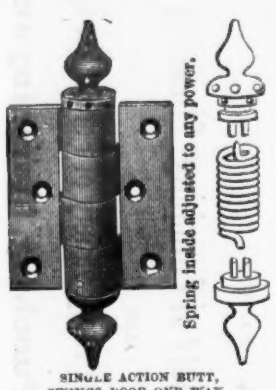

SINGLE ACTION BUTT, SWINGS DOOR ONE WAY.

Swing doors either way, allowing continual passing, and close them promptly, without noise.

Invaluable in cold weather, and in summer can be used as ordinary hinges.

Very Desirable

FOR

Stores, Banks & Churches,

AND ALL

Outside Winter Doors.

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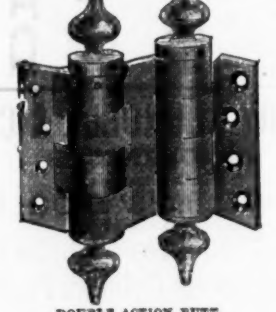

DOUBLE ACTION BUTT, SWINGS DOOR BOTH WAYS.

Noiseless Double Action Butt, as seen upon the door, swinging it both ways.

Prices Greatly Reduced, Oct. 1st., 1873.

Single Action.		Double Action.	
4 in. No. 6	$2 00	4 in. No. 50	$4 50
5 " " 11	3 00	6 " " 52	6 50
6 " " 16	4 00	7 " " 54	9 50
7 " " 22	5 00	8 " " 56	12 50
8 " " 26	6 50	8 " " 57	12 50
10 " " 31	8 50	10 " " 60	16 00

Send for Descriptive Circular and Price List.

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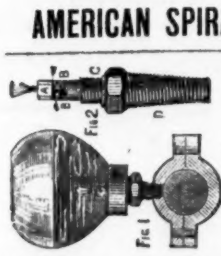

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FOR

Steam, Water & Gas. Brass Castings

a Specialty.

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For Punching, Shearing, and Stamping Metals.

Irregular motion of Crank-Shaft corrected by Eccentric Gear.

Saves 50 per Cent.

In wear of Dies and Punches and time lost in changing them. At **same speed** with the old Press, this gives **double the time** to adjust the work, insuring accuracy and greater production.

The Patent Adjustment warranted **Positive** under all pressures, and susceptible of the nicest shade of variation.

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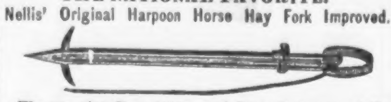

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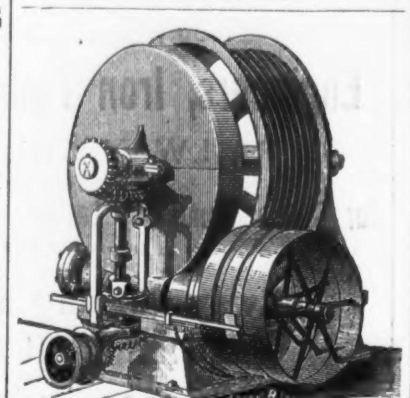

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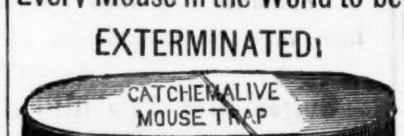

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